

1996 LOWER COOK INLET ANNUAL FINFISH MANAGEMENT REPORT



by

Wesley A. Bucher
and
Lee F. Hammarstrom

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Commercial Fisheries Management & Development Division
Central Region
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Anchorage, Alaska 99518-1599

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ACKNOWLEDGMENTS

1996 COMMERCIAL FISHERIES MANAGEMENT & DEVELOPMENT STAFF

The finfish operations for the Commercial Fisheries Management and Development Division, Lower Cook Inlet, employed eight permanent employees and nine permanent-seasonal employees in various area management and research programs during the 1996 season. Appreciation is extended to all personnel for a successful program during 1996.

Permanent Employees during the 1996 season:

Wesley A. Bucher	Area Finfish Management Biologist
Lee Hammarstrom	Assistant Area Finfish Management Biologist
Nick Dudiak	Area Resource Development/Sport Fish Biologist
William Bechtol	LCI Research Project Leader
Edward O. "Ted" Otis	LCI Assistant Research Biologist
Marnee Beverage	Administrative Clerk III
Paul Desjardin	Boat Officer III
Craig M.K. Forrest	Boat Officer I (1/96 - 7/96)
Marcia Macone	Boat Officer I (9/96 - 12/96)

Seasonal Employees:

D. Tom Balland	Fishery Biologist I
Mark Dickson	Fish & Wildlife Technician IV
Greg Demers	Fish & Wildlife Technician III
Philip Cowan	Fish & Wildlife Technician III
S. "Tom" Sigurdsson	Fish & Wildlife Technician II
Trish McNeill	Fish & Wildlife Technician II
Carla Milburn	Fish & Wildlife Technician II
Josephine Ryan	Fish & Wildlife Technician II
Carolyn Bunker	Administrative Clerk II

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fish and exvessel value was attributed to joint Alaska Department of Fish and Game (ADF&G), Cook Inlet Aquaculture Association (CIAA), and/or Chugach Regional Resources Commission (CRRC) lake stocking and fertilization projects at Leisure, Hazel, and English Bay Lakes in the Southern District, Kirschner and Bruin Lakes in the Kamishak Bay District, and Bear Lake in the Eastern District. Additionally, sockeye salmon produced by the enhancement project at English Bay Lakes provided subsistence harvests in the Port Graham Subdistrict of the Southern District. Pink salmon production from Tutka Hatchery, now operated by CIAA, was abysmal, with an overall return of around 569,000 fish (Table 9), representing only about one-third of the preseason projection. And, as has been the case since hatchery programs were taken over by private non-profit (PNP) corporations in LCI, a significant portion of the salmon harvest was utilized as hatchery cost recovery to recoup expenses incurred by the various stocking and enhancement projects throughout the management area. One-half of the total salmon harvest (Table 7) in numbers of fish was taken by CIAA and CRRC to support the lake stocking programs and Tutka Hatchery operations, equating to about 11% of the exvessel value of the LCI salmon fishery. Natural returns bound for LCI drainages contributed only a very small percentage to commercial harvests in 1996, primarily from East Nuka Bay in the Outer District.

Several notable factors continued to affect the amount and distribution of seine effort, and ensuing harvest of salmon, in LCI during 1996. The first was the policy adopted in 1994 by major processors regarding tender service. Previously processors routinely stationed a tender (or tenders) in remote districts in anticipation of salmon harvests and subsequent deliveries, even when run strengths and catches were marginal. When the practice was abandoned, however, seiners were forced to devise their own means to transport fish from these remote areas to a processing plant in Homer or elsewhere. Some fishermen, due to equipment limitations and the high cost of contracting out, were unable to fish in remote areas, while others retained the flexibility to fish these traditional areas because of onboard chilling equipment.

The second influential element affecting harvest and effort revolved around world wide market situations. Prices for all salmon species remained depressed, with that for pinks (the most numerous species in LCI) and chums especially low. This pricing structure often dictated the

fishing strategy of individual fishermen, even to the point of total non-participation. Coupled with the lack of tender service in remote districts, low prices were presumed to keep effort and harvest, to some degree, artificially low.

PRESEASON FORECAST

The projected 1996 LCI all-species salmon harvest of 2.2 million fish was over 60% greater than the most recent 20-year average. The majority of the harvest was expected to come as a result of hatchery and lake stocking enhancement projects involving pink and sockeye salmon. Formal total run forecasts for natural salmon returns other than pink salmon were not prepared because escapement and age-weight-length data are limited for those species. However, catch projections were calculated from relative estimates of parental run size, average age composition data, and recent relative productivity trends. Harvest projections and actual catches for all species in 1996 are listed in the following table:

SPECIES	PROJECTED HARVEST	ACTUAL HARVEST ^a	1976-1995 AVERAGE
Chinook	1,300	1,181	1,250
Sockeye	415,000	449,685	185,302
Coho	15,200	13,572	13,390
Pink	1,673,100	451,506	1,161,777
Chum	98,400	3,764	103,183
TOTAL	2,203,000	919,708	1,464,901

^a Preliminary data.

Strong sockeye returns were anticipated in all areas, with the exception of Chenik Lake in the Kamishak Bay District. Enhanced runs to Leisure and Hazel Lakes in the Southern District, Kirschner Lake in the Kamishak Bay District, and Bear Lake in the Eastern District were expected to dominate the sockeye returns. Although Chenik Lake has benefited from regular fry stocking and intermittent fertilization during recent years, as well as from recent natural

spawning escapements of up to 17,000 fish, adult sockeye returns in 1996 were expected to be very poor due to an epizootic of Infectious Hematopoietic Necrosis Virus (IHNV) within the system, and the entire run was to be protected for escapement. Commercial harvests resulting from sockeye enhancement projects at Bruin and Ursus Lakes in the Kamishak Bay District, as well as at English Bay Lakes in the Southern District, were also anticipated, while a new project at Grouse Lake in Resurrection Bay of the Eastern District was expected to contribute to hatchery cost recovery harvests for the first time.

Returns to the Tutka Bay Hatchery were expected to be the mainstay of the pink salmon fishery, with a forecasted harvest totaling over 1.4 million fish. The majority of these fish were anticipated as a result of a record 63.0 million fry released from Tutka Hatchery in 1995 (Appendix Table 30), and typical ocean survival rates for even-year runs should have produced an overall adult return approaching 1.6 million fish.

Generally poor 1994 pink salmon escapements to major systems contributed to a harvest projection of only 258,000 naturally-produced pinks throughout the entire LCI management area this season. Port Dick and Nuka Bay in the Outer District were forecasted to provide the largest potential for harvestable surpluses. Otherwise, overall natural pink returns were expected to be weak in all districts.

Significant chum salmon harvests appeared unlikely in 1996 since all major LCI systems experienced poor escapements during the 1991 and 1992 parent years. Additionally, a trend of weak returns over the past six seasons suggested that the 1996 chum return likely would be weak as well.

1996 SUMMARY BY SPECIES

Chinook Salmon

The harvest of chinook salmon, not normally a commercially important species in LCI, was similar to the 20-year average at 1,181 fish (Table 2, Appendix Table 12). Virtually all of the catch came from the Southern District and can be primarily attributed to enhanced production at Halibut Cove Lagoon and Seldovia Bay. Set gillnetters accounted for about 90% of the LCI chinook catch, with purse seiners taking the remaining 10%.

Sockeye Salmon

The 1996 LCI sockeye salmon harvest of 449,700 fish (Figure 10, Table 3) surpassed even the most optimistic expectations, shattering the previous record of 319,000 fish set in 1988 (Appendix Table 13) and exceeding the preseason forecast by over 8%. Sockeyes accounted for nearly 50% of the LCI salmon harvest in total numbers of fish, an unusual situation since pinks are traditionally a much more abundant species. Additionally sockeyes provided 92% of the exvessel value of the entire salmon fishery this season (Table 7). The 1996 LCI commercial sockeye harvest was characterized by contributions from generally successful enhancement projects throughout the management area as well as from non-local stocks which were thought to have intermixed with local stocks while migrating through the Southern District terminal harvest areas.

Returns to enhancement sites, which typically have provided the bulk of the LCI sockeye catch, were considered good in 1996. Harvests of enhanced runs of sockeye salmon returning to Leisure and Hazel Lakes in the Southern District, at a combined total of 200,000 fish (Figure 12, Appendix Table 15), provided over 44% of the LCI sockeye total and were approximately 67% greater than the preseason combined forecast of 120,000 fish to both systems. Also in the Southern District, the sockeye return to English Bay Lakes achieved an escapement within the desired range for the second consecutive year and only the third time in

the last 20 years while still providing a small harvestable surplus to both subsistence and commercial set gillnetters in the Port Graham Subdistrict. The strong return to this system can be attributed to the success of an ongoing rehabilitation project originally initiated by ADF&G in the late 1980's and presently being conducted by Chugach Regional Resources Commission in conjunction with the village of Nanwalek.

In the Kamishak Bay District, enhanced returns to Kirschner and Bruin Lakes produced a harvest of 31,600 fish (Table 3), significantly less than the combined preseason harvest forecast of 45,000 fish. Although no attempt is made to generate separate estimates of returns to these two sites, it is believed that the Kirschner Lake return was generally successful and probably achieved its individual preseason forecast of 30,000 sockeyes. On the other hand, the Bruin Lake return was considered a near total failure as only 650 sockeyes entered Bruin Lake Creek as escapement despite the fact that fishermen concentrated little effort near the mouth of the outlet creek. It should be noted that fish entering Bruin Lake Creek are prevented from reaching Bruin Lake by a set of barrier falls in the creek. The Ursus Lake return was also considered poor with only 900 fish documented in freshwater, and fishermen made no attempts at harvesting these fish, which were prevented from reaching the lake by a very steep ascent. No fishing was allowed at Chenik Lake in the Kamishak Bay District, site of another ongoing sockeye stocking/fertilization project, since the return was expected to be poor. An outbreak of a naturally occurring viral disease known as Infectious Hematopoietic Necrosis (IHN), commonly affecting juvenile salmon and trout, was observed in the Chenik system during the years 1991 through 1993. This outbreak caused increased mortality to young salmon, subsequently resulting in weak adult returns.

At Bear Lake in Resurrection Bay of the Eastern District, a catch of 44,900 sockeyes (Table 3) was nearly identical to 1995's total but fell short of the preseason harvest forecast of 76,000 sockeyes. The return to nearby Grouse Lake, also with a projected harvest of 76,000 fish, failed to materialize as only about 800 fish were documented.

Natural returns of sockeye salmon to LCI systems were considered relatively good, with all systems achieving or approaching escapement goals. In the Outer District, both Delight and Desire Lakes escapement goals (10,000 sockeyes each) were never observed, with the Desire Lake total estimated at 9,400 fish and Delight Lake at 7,700 (Appendix Table 23). It must be noted, however, that these index counts were hampered throughout the entire season by poor visibility during aerial surveillance flights, thus the final estimates are believed to be conservative and actual escapements were undoubtedly higher. A small harvestable surplus was taken by the seine fleet in East Nuka Bay (Table 3). Returns to Delusion (Ecstasy) Lakes, a recently formed glacial lake system in East Nuka Bay which supported no documented salmon run prior to the mid-1980's, had a peak aerial escapement estimate of 720 sockeye salmon in 1996. Despite opening Aialik Bay in the Eastern District to fishing in early July in an attempt to gauge run strength to Aialik Lake, where the escapement range is 2,500 to 5,000 sockeyes, very little effort was directed at this stock and the majority of the run entered the system as escapement, estimated at 3,500 fish (Table 3). At Mikfik Lake in the Kamishak Bay District, no fishing effort on the return occurred during the season and the entire run entered the system as escapement, with a final cumulative index estimated at 10,500 fish (5-7,000 goal range).

The Southern District experienced an infrequent, but not uncommon, influx of sockeyes believed to be of non-local origin. Average weights of sockeyes in this district, taken from fish tickets, were significantly higher than the normal 3.8 to 4.3 pounds per fish attributed to sockeyes returning to the China Poot and Hazel Lake enhancement sites during this decade. The trend was first noticed during the set gillnet fishery, which opened by regulation earlier than the seine fishery on the first Monday in June, when fishermen reported above average sockeye catches in the Seldovia Bay District. The trend continued into the seine season as well, progressing until early August, when catches of these larger sockeyes then began to trail off. Based on run timing and postseason age-weight-length analysis, it was estimated that nearly 160,000 of these fish were of Upper Cook Inlet origin and were mixing with local stocks within the terminal harvest areas before continuing to migrate north. Reasons for such an influx of fish are not known, although many local fishermen believe strong westerly winds

will often induce fish to alter their migration patterns and swing into Kachemak Bay. Although no formal records are kept, anecdotal observations did not reveal unusually strong or numerous westerly winds during 1996.

Coho Salmon

The commercial harvest of 13,600 coho salmon (Table 4) in 1996 was nearly identical to the average (Appendix Table 17). The harvest was greatest in the Southern District, with the only other significant harvest coming from the Eastern District, but catches in the Eastern District were primarily from the Seward Silver Salmon Derby and CIAA hatchery cost recovery at Bear Lake. Coho run assessment in LCI is limited, with commercial, sport, and personal use harvests providing the best indicators of run strength. Based on these indicators, returns during 1996 were considered strong. Despite the relatively strong returns, low prices and the lack of remote tender service discouraged the majority of the seine fleet from targeting cohos late in the season, especially in the Kamishak Bay District, thus the harvest was not necessarily indicative of run strengths. Only one aerial survey was flown specifically for coho salmon in September, at Clearwater Slough in the Northshore Subdistrict of the Southern District, with a resulting index count indicating good escapement at that system.

Pink Salmon

Returns of pink salmon, usually the dominant species in numbers of commercially harvested fish in LCI, were generally very poor throughout the management area in 1996, with an overall harvest of only 451,500 fish (Figure 14, Table 5). This number is the smallest since 1990 and represents the fifth lowest commercial catch in the last 20 years (Appendix Table 18). Nearly all were taken in the Southern District (Table 5, Appendix Table 18) as a direct result of Tutka Hatchery production. However, nearly 95% of the Southern District total, or about 419,000 fish, was utilized for Tutka Hatchery cost recovery (Tables 1 and 5), with an additional 138,000 fish taken for hatchery brood stock purposes. The estimated overall hatchery return, including escapement into Tutka Creek, brood stock, and commercially

harvested fish, was 568,600 pinks (Table 9), a very disappointing run considering the preseason projection totaled nearly 1.6 million fish. The 1996 survival rate of 0.9% represented the second lowest in the facility's twenty year history.

The Outer District produced the greatest, albeit meager, contribution of natural pinks to LCI catches, with a total harvest of only 7,200 fish (Table 5, Appendix Table 18), all coming from East Nuka Subdistrict as incidental catches during the directed sockeye fishery there. In the Kamishak Bay District, no pink harvest occurred during 1996. Pink salmon escapements in all districts of LCI were generally poor as most primary systems failed to achieve escapement goals. Notable exceptions were streams in the Port Dick Subdistrict of the Outer District, at Rocky River in the Outer District, and at Bruin Bay River in the Kamishak Bay District; stronger than expected returns and no fishing effort produced escapements within or above the desired ranges at these systems (Appendix Table 24).

Chum Salmon

The 1996 commercial chum salmon harvest of 3,800 fish (Table 6) represented less than 4% of the 20-year average and marked the eighth successive below-average season in Lower Cook Inlet (Figure 15, Appendix Table 21). The low numbers were somewhat anticipated based on the recent years' trend of weak returns, and as a result conservative fishing schedules were implemented in an effort to secure adequate escapements and reverse the declines in chum salmon numbers. The conservative strategy was hardly necessary, however, as low prices coupled with the lack of tender service in remote districts once again discouraged the fleet from targeting this species. Consequently, a number of systems, particularly those in northern Kamishak Bay, achieved their minimum escapement goals. One major system, McNeil River in the Kamishak Bay District, failed to attain the lower end of its escapement goal range of 20,000 to 40,000 fish for the seventh straight year (Appendix Table 25).

1996 EXVESSEL VALUE

The estimated exvessel value of the 1996 salmon harvest in LCI, with no attempt to include any postseason adjustments in price paid to fishermen, was approximately \$2.287 million (Table 7, Appendix Table 2), making it the second highest since 1989. Purse seine gear in the common property fishery, which normally accounts for the majority of the catch, comprised about \$1.55 million or two-thirds of the overall total (Table 7), while set gillnets accounted for \$466,600 or 21%. An estimated \$258,100, or about 11% of the entire exvessel value of the LCI salmon fishery, was utilized for hatchery cost recovery purposes. Average prices paid to fishermen in 1996, not including any postseason adjustments, were as follows: chinook - \$1.33/pound; sockeye - \$0.91/pound; coho - \$0.40/pound; pink - \$0.08/pound; and chum - \$0.18/pound (Appendix Table 3). The latter two figures are the lowest ever recorded for those species during the past 20 years.

1996 DISTRICT INSEASON MANAGEMENT SUMMARIES

Southern District

Set Gillnet Fishery

An Area H set gillnet permit holder is allowed to fish in both Upper and Lower Cook Inlet, but there are only five beach areas in LCI, all located along the south shore of Kachemak Bay in the Southern District, where set gillnets may be used (Figure 2). The limited area provides only enough productive fishing sites to accommodate approximately 25 set net permits.

The 1996 LCI set gillnet harvest totaled 93,800 fish, the highest catch since 1981 and nearly 50% greater than the 20-year average (Appendix Table 7). Almost three-fourths of the catch was comprised of sockeyes, followed by pinks at 15%. For comparison, typical species composition in the commercial set gillnet fishery during the past decade has been 43%

sockeyes, 42% pinks, 6% cohos, 6% chums, and 3% chinooks. Catches of chinook salmon, at 1,054 fish, were about equal to the recent 10-year average. Enhancement efforts directed at recreational fisheries in Seldovia Bay and Halibut Cove Lagoon are primarily responsible for the commercial gillnet chinook catch during 1996.

For the second consecutive season, both the subsistence and commercial set gillnet fisheries in the Port Graham Subdistrict, including the English Bay Section, were allowed to target on sockeyes returning to English Bay Lakes. Because the return appeared strong in early July, limited cost recovery by CRRC was also allowed on English Bay sockeyes. Unfortunately the catches were probably bolstered by sockeyes of non-local origin and the latter portion of the return fell off more abruptly than originally anticipated. As a result the desired escapement goal of 15,000 fish was not achieved, but the final escapement of 12,400 fish (Table 3, Appendix Table 23) still fell within the desired range of 10,000 to 20,000 sockeyes. The commercial harvest, although relatively small at 12,700 sockeyes (Table 3), represented the second consecutive year of directed sockeye harvests in the Port Graham Subdistrict since 1988 and once again showed the potential for even greater returns in future years.

Several factors contributed to the above average set gillnet harvests in 1996. First it is believed that a significant portion of the sockeyes taken in the set gillnet fishery were of non-local origin, probably destined for Upper Cook Inlet based on average weight information. Strong local returns of enhanced sockeyes to Leisure and Hazel Lakes likely contributed to the above-average catches as well. In addition, increased fishing effort also boosted the set gillnet harvests in the Southern District. The number of set gillnet permits actively fished in LCI this season (24) was the highest since the 1988 season (Appendix Table 1).

Seine Fishery

Sockeye Salmon

The overall catch of sockeye salmon by all gear types, at 358,200 fish, set a new record for the Southern District (Appendix Table 13) and was over three times the recent 10-year average. Purse seiners in the common property fishery accounted for three-fourths of the sockeye salmon landed in the district in 1996 (Table 1).

As in recent years, waters of China Poot Bay and Halibut Cove Subdistricts, and a portion of the Tutka Bay Subdistrict, were opened to seining five days per week beginning Monday, June 24, in anticipation of strong returns to Leisure and Hazel Lakes. Within these subdistricts, however, waters of the China Poot and Hazel Lake Special Harvest Areas (SHA's; Figure 3) were only opened to authorized agents of CIAA at this time, seven days per week, for the express purpose of hatchery cost recovery; they were to be kept closed to the common property commercial fishery until the revenue goal at each SHA was achieved. Additionally, closed waters were slightly expanded in the Hazel Lake Section of China Poot Subdistrict (Figure 3) this season in an effort to facilitate the "buildup" of sockeyes inside the SHA's and thus expedite the cost recovery process. The new closed waters boundaries came as a result of input from fishermen during preseason meetings held to determine methods for enhancing and refining the attainment of LCI cost recovery revenue goals.

Preseason combined harvest projections for returns to the Leisure and Hazel Lakes stocking projects were estimated at 120,000 fish. The actual commercial harvest of fish returning to the two sites, including cost recovery, was estimated at 200,000 fish (Figure 11, Appendix Table 15), comprising 45% of the total LCI sockeye salmon harvest (Table 3). Because of the geographic proximity of these two projects, the overlapping area of harvest, and the lack of tagging, no definitive assessment of separate returns to each system can be established. However, fish returning as a result of these two projects undoubtedly contributed to seine catches in the Halibut Cove and Tutka Bay Subdistricts, as well as those in China Poot Bay

Subdistrict. It was estimated that personal use dip net fishermen and sport fishermen harvested another 10,000 sockeyes at the head of China Poot Bay. The 1996 total return from both projects was estimated at 210,400 sockeyes (Appendix Table 15).

As outlined in the Crooked Creek Hatchery Annual Management Plan (AMP) prior to the season, the revenue goal necessary to meet operational expenses incurred in LCI sockeye salmon lake stocking projects was set at \$100,000, to be split amongst cost recovery harvests as follows: 60% from combined China Poot and Hazel Lake SHA's, both in the Southern District, and 40% from the Kirschner and Bruin Lakes SHA's in the Kamishak Bay District. The revenue goal was set higher than the actual amount necessary to cover 1996 costs in order to help offset the reduced harvests expected in 1997, which will be a result of the limited stocking in 1994. No cost recovery was planned at Chenik Lake in 1996 since weak returns were expected. Cost recovery harvests inside the China Poot and Hazel Lake SHA's (Figure 3) were to occur at CIAA's discretion early in the runs since harvests would take place without interference or competition from the fleet at large. Projected harvests of 23,100 sockeyes from the China Poot and Hazel Lake SHA's were necessary to achieve the combined goal of \$60,000 for these two areas, assuming an average price of \$0.65 per pound and an average weight of 4.0 pounds per fish. As previously described, these SHA's were to remain closed to common property seining until the combined goal established for the two areas was achieved.

CIAA once again contracted the Cook Inlet Seiners Association (CISA) to undertake sockeye cost recovery in LCI for the 1996 season. CISA enlisted volunteers from within the fleet, and the first cost recovery harvest in the China Poot SHA occurred on July 5, netting just over 3,300 fish, considered good for this relatively early date and indicating a potentially strong return. By that time, a firm contract price for sockeyes had been established at \$0.95 per pound, and with initial average weights running slightly higher than the preseason estimate of 4.0 pounds per fish, the number of fish necessary to achieve the revenue goal was revised downward to a new combined total of approximately 14,350 fish.

Three more cost recovery harvests occurred over the next nine days in the China Poot SHA as the sockeye run continued to build, bringing the total harvest to 12,100 fish through July 14. On July 16, the first effort in the Hazel Lake SHA resulted in a catch about 2,100 sockeyes. Once again, higher than expected average weights for sockeyes from both SHA's boosted the cumulative harvest to nearly 65,000 pounds, thus exceeding the required revenue goal. As a result, the China Poot and Hazel Lakes SHA's were closed to cost recovery harvest on July 16, and both subdistricts were opened to common property seining seven days per week beginning July 17, except for a small portion of the China Poot Section near China Poot Creek, which remained closed to commercial fishing on weekends.

Common property catches were the highest of the season over the next two days, July 17 and 18, with a combined harvest of nearly 53,000 sockeyes taken by about 20 vessels in the two sections. Hazel Lake catches remained high for an additional two days (a combined 18,300 fish for July 19 and 20), then decreased in both areas, remaining steady at a combined total of 5,000 to 8,000 fish per day until July 26. Catches then steadily declined thereafter into the first week of August, with the last landing from China Poot Subdistrict coming on August 3. The final commercial catch in the two sections, including cost recovery, was 225,200 sockeyes (Table 3). Because very little seine effort occurred within waters of the Tutka Bay Subdistrict for any species, the purse seine harvest of sockeyes was only 200 fish in this subdistrict.

Pink Salmon

Returns of pink salmon to the Tutka Bay Hatchery contributed to an overall Southern District harvest of 450,000 fish, the lowest for the district since 1992 (Table 5, Appendix Table 18). Waters of Tutka Bay Subdistrict outside of Tutka Bay proper were open to commercial seining five days per week beginning June 24, while waters within the Tutka Bay SHA (Figure 4) were open to hatchery brood stock and cost recovery harvest by authorized agents of CIAA on a continuous basis as established in the Tutka Hatchery Annual Management Plan beginning July 1. The plan called for hatchery incubators to be filled to maximum capacity if possible, and excess fish beyond brood stock and natural escapement requirements were to be harvested

for cost recovery to help offset operational expenses, estimated at \$450,000 for 1996. A minimum of 155,000 fish (115,000 females) were necessary for hatchery brood stock in order to achieve the goal of 125 million eggs, and an additional 10,000 pinks were needed to meet the natural spawning escapement goal for Tutka Creek.

Because the price for pinks was so low (\$0.05 to \$0.10 per pound), no common property effort specifically targeting pinks occurred during 1996. Thus the only effort directed towards Tutka pinks was for hatchery purposes. Based on the preseason forecast, it appeared that virtually the entire return in excess of escapement and brood stock requirements would be necessary for hatchery cost recovery, but achieving the revenue goal was very unlikely even with a successful return due to the severely depressed prices. The first cost recovery harvest took place on July 6 by one vessel working inside Tutka Lagoon proper. A second catcher boat working waters outside Tutka Lagoon, as was the case in 1995, proved unnecessary as the run never attained the strength to justify additional effort. The sluggish return dictated an almost leisurely fishing schedule during the next 10 days as the designated catcher boat routinely fished for two consecutive days and then did not fish for a day in order to allow enough fish to build up to warrant further harvest. Through July 23, daily cost recovery harvests averaged only 36,200 pinks per fishing day, with a peak of only 58,200 fish on July 17. Cost recovery catches declined after July 23, averaging just 11,500 pinks per day for the five days fished until the end of the month.

Unlike past seasons, no additional fishing opportunities for the common property seine fleet were considered during the 1996 season because of the weak return. The last hatchery cost recovery harvest took place on July 31. The total commercial catch of pink salmon in Tutka Bay Subdistrict this season, including both seine and setnet catches but excluding hatchery cost recovery, amounted to only fish 6,900 fish (Table 5). A total of 419,200 pinks were sold by CIAA for cost recovery, with an additional 138,000 fish harvested for brood stock (Table 9). The pink salmon escapement of 3,500 fish (Table 5, Appendix Table 24) into Tutka Creek failed to fall within the desired range of 6-10,000 fish. The total return of pinks to Tutka

Hatchery was estimated at 568,600 fish (Table 9), representing just over one-third of the preseason forecast.

Returns of wild pink salmon stocks to other systems in the Southern District were generally poor as indicated by ground survey escapement counts. Escapement into Humpy Creek fell short of the desired range of 25,000 to 50,000 fish with a final estimate of 9,000 pinks (Appendix Table 24). Desired minimum escapements also fell short at Barabara Creek, Seldovia River, and Port Graham River (Table 5, Appendix Table 24).

Other Species

Southern District chum salmon returns were poor for a seventh consecutive year. Nonetheless, the chum harvest of 3,450 fish (Table 6) represented the second highest total since 1988 and nearly equaled the recent 10-year average for the district (Appendix Table 21). Set gillnets accounted for almost 80% of the harvest, with the Tutka Bay and Seldovia Bay Subdistricts accounting for the greatest proportions of the district-wide catch (Table 6). Escapements into Southern District chum systems were generally poor.

Although minor in total numbers of fish, the majority of the Southern District chinook harvest usually consists of incidental catches of adult fish returning to three separate enhancement projects. The 1996 Southern District harvest of 1,180 chinooks was the lowest since 1987 (Appendix Table 12), with about 90% taken by set gillnetters. The coho salmon harvest of 9,500 fish was the highest since 1992 and was roughly double the 20-year average (Appendix Table 17). Approximately 60% of the coho harvests were taken in the set gillnet fishery while seiners accounted for the remaining 40%.

Kamishak Bay District

Sockeye Salmon

The entire Kamishak Bay District, with the exception of the Paint River Subdistrict, opened to salmon seining by regulation on June 1, with two regular 48-hour weekly fishing periods established by emergency order. The earliest sockeye salmon return to the management area, at Mikfik Creek in the McNeil River Subdistrict, appeared strong during the first aerial survey on June 5 with an estimate of 3,600 fish, and as a result fishing in McNeil River Subdistrict was extended to five days per week beginning June 7. Unfortunately, even the liberalized fishing schedule did not attract any effort as fishermen were unwilling to gamble on fishing this traditionally small return considering the lack of tender service to this remote district. An aerial survey on June 11 showed an increase in escapement to over 6,500 sockeyes, which turned out to be the peak single survey estimate of the season. Three more aerial surveys conducted in late June and early July resulted in reduced daily estimates, indicating that fish were only trickling into the system after the peak survey. During the late stages of the run in early July, low water conditions delayed fish entry into the lake system and probably resulted in increased predation by brown bears. The final escapement index at Mikfik Creek was 10,500 sockeyes (Table 3, Appendix Table 23), exceeding the desired range of 5,000 to 7,000 fish.

With no early effort directed toward sockeye salmon in the McNeil River Subdistrict, seiners would next normally turn their attention to the Chenik or Douglas River Subdistricts during the last days of June. Once again, however, no fishing was expected to occur at Chenik Lake this year due to the effects of the IHNV outbreak in previous years and the subsequent decrease in adult returns. Despite the forecasted weak return, the staff was hopeful that the run would at least approach the escapement goal of 10,000 sockeyes. Unfortunately, a third consecutive year of dismal returns was manifested, and even with no fishing effort occurring during the entire season, the total escapement past the weir at Chenik Lake was only 2,990 sockeyes (Table 3, Appendix Table 23). No effort occurred in the Douglas River or Kamishak

River Subdistricts as seiners instead chose to wait for more lucrative fishing elsewhere in the district.

The next stop on the Kamishak seine circuit was nearby Kirschner and Bruin Lakes in the Bruin Bay Subdistrict. Both lakes are also sites of sockeye salmon lake stocking programs, but a steep falls at the tideline of the former and migrational barriers in the outlet creek of the latter preclude escapement into the lake. Preseason management strategy for the Bruin Bay Subdistrict, as outlined in the Crooked Creek AMP, was to open the Kirschner and Bruin SHA's (Figure 6) to hatchery cost recovery fishing on a continuous basis beginning June 24 while keeping both closed to common property seining, thus allowing opportunity for CIAA to achieve the sales harvest goal of \$40,000 at the beginning of the run. As soon as the goal was met, the two SHA's were to be closed to cost recovery harvest and opened to commercial seining so the fleet could work the areas uninhibited for the remainder of the season. Once again, the preseason average price for sockeyes was projected to be \$0.65 per pound, and at an average weight of 4.0 pounds per fish, CIAA needed to harvest approximately 15,400 sockeye salmon in order to achieve the revenue goal at Kirschner. The combined preseason forecasted return to Kirschner and Bruin Lakes was 45,000 sockeyes.

CIAA had made arrangements prior to the season for a CISA vessel to conduct cost recovery, with the first effort occurring in the Kirschner Lake Section on July 15, resulting in a harvest of 13,500 fish. At \$0.70 per pound, the inseason price for Kirschner cost recovery sockeyes was slightly greater than the preseason estimate, and the cumulative poundage from the first harvest (56,700 pounds) was sufficient to achieve the revenue goal for the season. In response, the Kirschner and Bruin Lakes SHA's were closed to cost recovery fishing on July 16 and opened to the common property fishery 18 hours later on July 17 seven days per week. Since escapement into Bruin Lake was not possible, no markers were in effect at Bruin Lake Creek and fishing was allowed up to the stream mouth.

Only two boats fished the two areas opened to continuous fishing, targeting on sockeyes through the end of July. Fishermen had encountered difficulty locating and catching sizable

concentrations of fish in the shallow waters near the mouth of Bruin Lake Creek during previous seasons, so it was unclear how the sockeye fishery in Bruin Bay proper would progress. Despite the liberalized fishing area, no effort occurred in Bruin Bay proper as seiners focused all their efforts on the Kirschner Lake return. A total of 18,100 sockeyes was taken in the Kirschner Lake Section (Table 3), but seiners felt that a small proportion of these fish were probably destined for Bruin Lake Creek based on their orientation during fishing operations in the Kirschner Lake Section. Since the two enhancement projects are in relatively close proximity and no tag/recovery program is in place, no attempt was made to distinguish separate totals for these returns. However, it is presumed that the return to Kirschner Lake probably approached its preseason forecast of 30,000 sockeyes, while the Bruin Lake return was a near total failure. An additional 650 sockeyes were estimated in Bruin Lake Creek during an aerial survey on July 31, unable to reach the lake due to migrational barriers.

After disappointing results in 1995, a relatively new sockeye enhancement project at Ursus Lake in Ursus Cove Subdistrict was expected to produce a questionable adult return in 1996, with preseason estimates ranging up to 3,000 fish. Since these fish are also prevented from reaching the lake to spawn by migrational barriers in the creek, a total harvest was desired. A combination of weak returns, as documented through aerial surveys, and difficult fishing conditions resulted in no effort or harvest on this stock, with an estimated 900 sockeyes stranded in the creek.

Pink Salmon

Preseason pink salmon projections for the Kamishak Bay District were poor, with no harvestable surpluses forecasted for any subdistricts. Early aerial surveys in late July reinforced the projection. The low prices and weak returns resulted in zero effort targeting pinks during 1996, with a total harvest of only 36 fish (Table 5, Appendix Table 18), all incidentally taken in the sockeye fishery. All three major pink systems failed to achieve their escapement goals (Appendix Table 24) despite the lack of fishing effort.

Chum Salmon

Cumulative chum salmon catches for the entire Kamishak Bay District totaled only 27 fish, similar to the very poor 1994 harvest (Appendix Table 21) and once again reflecting the meager returns and low prices paid for this species. All chum harvest occurred incidentally in the sockeye fishery.

Chum salmon escapement into McNeil River began slowly, with just over 1,600 fish first documented in fresh water in late June by aerial survey. By the next survey on July 3, the index estimate had increased to only 2,700 chums, reinforcing the earlier assessment that the McNeil chum return was weak. As is common in Kamishak Bay, weather conditions precluded aerial enumeration for nearly two weeks, therefore escapements were not well documented during this time period. The following survey on July 15 revealed only about 9,600 chums in freshwater, at a time when index counts should have been near their peak. Weather again plagued survey attempts for 10 days, but the next survey on July 25 brought no increased index counts with an estimate of 9,800 chums, which subsequently turned out to be the peak daily estimate for the season. Such counts suggested that either few new fish were entering the system as escapement or that predation by brown bears was resulting in substantial chum salmon mortality. In any event, all index counts, as well as informal ground observations from the McNeil bear viewing camp, represented further proof that in-river escapement was once again poor.

Even though returns appeared weak, the McNeil River Subdistrict was allowed to remain open through the 1996 season in hopes that enough fish would be landed to obtain an adequate age-weight-length (AWL) sample. However, the staff once again maintained a continuous dialogue with the fleet and made it abundantly clear that any significant catch of chums without a corresponding increase in the escapement rate at McNeil River would result in immediate closure of the subdistrict. This strategy was hardly necessary since the combination of low prices and lack of tender service proved effective at protecting the chum return from any fishing mortality, thus allowing the entire run to enter the river. With an escapement goal

of 20,000 to 40,000 chums for this system, the numbers of fish present still were not sufficient to achieve the in-river goal. The final estimated escapement index at McNeil River was 16,100 chums (Appendix Table 25), marking the seventh consecutive year the river's goal has not been met. Several attempts to collect samples via beach seining in McNeil Lagoon during the season were only partially successful as the low numbers of fish precluded the attainment of a statistically valid minimum number of fish.

Elsewhere in the Kamishak Bay District, aerial surveys began to document fair late chum returns to northern Kamishak Bay systems in Ursus Cove, Cottonwood Bay, and Iniskin Bay Subdistricts by early August. Chum escapements into major northern Kamishak systems continued to increase, but low prices and market demand once again kept most of the fleet away. Therefore, these chum returns were allowed to enter their natal streams as escapement, and all northern Kamishak Bay systems approached or achieved their established goals (Appendix Table 25). The limited aerial survey information for the Big and Little Kamishak River systems in the southern portion of the district indicated that neither of these systems achieved their desired chum escapement goals in 1996.

Other Species

Chinook salmon harvests in the Kamishak Bay District historically have been insignificant (Appendix Table 12). On the other hand, coho harvests within the district have at times been substantial, providing fishermen with some lucrative late season catches. Coho assessment in LCI is very limited, but early indications from other areas within LCI, as well as from adjacent management areas, suggested strong returns. Despite the apparently strong returns, lack of tender service and low prices conspired to preclude any effort, with a resulting district-wide harvest of exactly one fish (Appendix Table 17), representing a new record low coho catch for the Kamishak Bay District.

Outer District

Sockeye Salmon

Outer District sockeye harvests historically have focused on natural returns to the Delight and Desire Lakes systems in East Nuka Bay Subdistrict. A lake stocking project in the Port Dick area during the late 1980's provided additional fish for harvest in the early 1990's, but stocking was discontinued after 1989 and a small harvest in 1993 was the last documented catch. Preseason projections forecasted a harvest of up to 23,800 sockeyes for the entire Outer District. The actual harvest totaled 15,000 fish (Table 3), the third highest catch during this decade and virtually equal to the recent 10-year average (Appendix Table 13).

Aerial surveys, the primary method of assessing sockeye returns to Delight and Desire Lakes in East Nuka Bay, were plagued throughout the 1996 field season by poor viewing conditions induced by inclement weather. Surveys began in mid-June, but the first sockeyes at both Delight and Desire Lakes were documented beginning June 27, albeit in relatively small numbers (575 and 450, respectively). The Delight Lake counts increased significantly by the time of the next survey on July 1 to an estimated 3,300 fish in fresh water. Counts for Desire Lake, just north of Delight Lake, during this time increased less dramatically to an estimate 1,200 sockeyes on the same date, a somewhat unusual situation since sockeye run timing for Desire Lake is traditionally earlier than Delight. With escapement goals of 10,000 sockeyes for each of these lake systems, the staff felt that no commercial openings were warranted in East Nuka Bay at that point.

The next survey on July 5 was again hampered by windy conditions making aerial observation difficult. At Delight Lake, over 4,000 sockeyes were seen in the freshwater lagoon, but at the lake itself as well as at Desire Lake few fish were spotted due to the elements. Ten days passed until the next survey due to inclement weather, but on July 15 a strong showing was documented at both systems despite stiff winds: the Delight Lake count increased to 9,400 sockeyes while the estimate at Desire had jumped to 7,700 fish. Both figures represented sizable percentages of

the escapement goals, and as a result East Nuka Subdistrict was opened to seining five days per week beginning July 17.

Seine fishing effort commenced on July 19, but harvest numbers were meager at only 900 sockeyes that day. Although modest effort and harvest continued that week, catches did not increase until the following week, with a peak daily harvest of 3,800 sockeyes taken on July 26. Poor weather continued to hinder aerial surveys, but the catch rates and historical run timing suggested that the escapement goals at both lake systems were virtually assured. Therefore, regulatory markers were repealed beginning July 29 and fishing was allowed up to the stream mouths at both locations. This marker change also allowed fishing inside salt waters of McCarty Lagoon, near Delight Lake, but the freshwater lagoon at Delight remained closed.

Fishing effort by only two to three vessels continued for nearly three more weeks, but the catch of July 26 proved to be the highest daily catch of the season as harvests declined steadily thereafter. The final harvest from East Nuka Bay came on August 13, bringing the cumulative total harvest to 15,000 fish (Table 3, Appendix Table 14) taken by three vessels. Aerial surveys were unable to detect any further increase in escapements over the remainder of the season, so the peak daily counts of 9,400 sockeyes at Delight Lake and 7,700 sockeyes at Desire Lake (Appendix Table 23) were used as the final escapement estimates. However, the poor weather experienced throughout the season during surveys would strongly suggest that these must be considered minimum figures and that actual escapements probably exceeded the escapement goal of 10,000 fish for each system.

A third lake system known as Delusion (or Ecstasy or Delectable) Lakes in East Nuka Subdistrict has been monitored over the last several seasons to document the sockeye return there. Located near the head of the East Arm of Nuka Bay, the two-lake system is relatively new, formed during the late 1970's and early 1980's by a receding glacier. This fact was substantiated by reviewing charts and maps drawn prior to the mid-1980's, as no lakes are indicated at the site of the present bodies of water. Prior to the 1980's, no salmon were known to utilize the system, but in approximately 1989, during a routine aerial survey, adult sockeye

salmon were documented in the system by the staff for the first time. Each year since then, aerial surveys have revealed sockeye salmon as well as pink salmon in the system. The peak 1996 aerial count of 720 sockeyes was recorded during a July 26 survey. Little is known of the origins of this return, although the predominant hypothesis suggests that sockeyes probably strayed from nearby Desire and/or Delight Lake to colonize this new lake system. Sampling of sockeyes in this system was conducted in 1992, 1993, and 1994 by ADF&G personnel, with help from University of Alaska students on site. Otoliths and length measurements indicated primarily large 3-ocean fish (six years old). Additional tissue samples were taken from post-spawning individuals in 1993 and 1994 for inclusion into the genetic baseline data set and future genetic stock identification analysis.

Pink Salmon

Harvest forecasts for pink salmon in the Outer District were fairly conservative at 181,000 fish, with the greatest potential for harvestable surpluses expected at Port Dick and Nuka Bay. The actual harvest of 7,100 pinks (Table 5, Appendix Table 18), taken by three vessels, was only 4% of the preseason projection and was the fourth lowest catch for the district in the last 20 years. Once again the ubiquitous theme of low prices and market demand for this species combined to minimize effort.

For the fifth consecutive season, a management strategy was employed in the Port Dick area based on input from fishermen over the winter of 1991-92. Concerns over fish quality led to a plan whereby the outer areas of the subdistrict would be opened on a set calendar date earlier than the traditional opening date, unlike former years when openings were based on stream escapement rates and fish abundance in saltwater. It was hoped that opening areas further away from freshwater systems at an early date would allow the fleet opportunity to harvest higher quality fish before they became freshwater marked, thus increasing their market value. However, weak returns to Port Dick during the previous four years left the management plan essentially untested going into the 1996 season.

As stated in the Port Dick Management Plan, the South and Outer Sections of the Port Dick Subdistrict opened to fishing for two 40-hour weekly fishing periods, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and from Thursday 6:00 a.m. until Friday 10:00 p.m., beginning on Monday, July 15. At that time, chums were present in Port Dick (head end) Creek and on the nearby saltwater flats, but pinks had not yet begun to show. The North Section of Port Dick Subdistrict remained closed to protect chums returning to streams within that section, primarily Island Creek.

Pinks probably first appeared in Port Dick (head end) Creek near the end of July, as a ground survey on July 22 did not detect any fish and the next survey on August 5 documented about 3,300. The low numbers suggested that even the conservative forecast may have been overly optimistic. This relatively weak early showing of pinks at Port Dick basically foretold the eventual magnitude of the return, not unusual in that even-numbered years produce substantially smaller returns than odd years. Because of the weak run strength, no effort occurred in the subdistrict during the season and subsequently no fish were harvested in any portion of the Port Dick Subdistrict (Appendix Table 20). Final estimated escapement at Port Dick (head end) Creek was 23,200 pinks (Table 5, Appendix Table 24), somewhat of a surprise but a bright spot nonetheless as the final estimate fell within the desired range of 20,000 to 100,000 fish.

The North Section of Port Dick Subdistrict was never opened to fishing in order to protect chums returning to Island Creek, but the closure had little effect on actual effort as low prices were a much stronger incentive to keep fishermen away. The final estimated escapement of 40,100 pinks at Island Creek (Appendix Table 24) was over double the upper end of the desired range of 12,000 to 18,000 fish, again in contrast to the trend of poor pink salmon escapements throughout the remainder of the LCI management area.

As expected, the even-year phenomenon manifested in weak pink returns at nearby Windy Bay. Pinks had begun entering fresh water by the end of July, with an estimated cumulative ground count of just over 1,000 pinks into both systems. Although counts did increase slightly, numbers of fish present were never sufficient to achieve the escapement goals, as the run to Windy Left

Creek ended with a final estimate of 9,900 pinks and Windy Right had 2,500 (Table 5, Appendix Table 24). It is hoped that pink returns to Windy Bay systems will rebuild despite extensive logging that has occurred in recent years, which has led to diverse speculation regarding future effects on fishery resources there. The ground survey team reported that nearly all trees in the prescribed 66-foot riparian buffer strip are now down, with few if any live trees left standing. High winds apparently caused many of the uncut trees in this strip to fall across or into the creek. The limited buffer strips were obviously not wide enough in this Outer Gulf coastal area to prevent damage caused by commonly high winds (hence the local name) or preclude the subsequent "domino effect" from blowdowns.

At Nuka Island, pink salmon were first documented in fresh and salt water at South Nuka Island Creek during an aerial survey July 26, but cumulatively at only 1,500 fish, run strength was predictably weak. Subsequent ground surveys conducted at South Nuka Island Creek in August confirmed the weak return, with a final escapement estimate of 6,800 pinks (Table 5, Appendix Table 24), representing about two-thirds of the established goal for the system.

Considering the poor pink returns to other LCI streams, Rocky River was another "bright spot" in an otherwise bleak showing of wild pink runs this seasons. Significant numbers of pinks were detected in fresh water at Rocky River during the first survey of the system on August 7. Counts increased to 52,000 pinks less than one week later on August 13, with additional fish documented in salt water. The increasing numbers observed during the mid-August survey resulted in a final escapement estimate of 80,000 pinks into Rocky River (Appendix Table 24), representing the fourth highest escapement into this system since statehood and easily achieving the 50,000-fish goal.

Elsewhere in the Outer District, pink salmon returns to Port Chatham were considered fair, with estimated escapements amounting to 8,600 pinks (Appendix Table 24), just short of the 10,000 to 15,000 fish range for the systems there. An estimated 8,300 pinks entered the unnamed stream at the head of Chugach Bay, regarded as good escapement considering the small size of the system. In the East Arm of Nuka Bay, pinks likely destined for Desire Lake Creek produced

moderate incidental catches in August from fishing effort directed at sockeyes. Harvests totaled 7,100 pinks (Table 5, Appendix Table 18), which amounted to the entire district-wide catch for the season. No estimate of escapement was obtained for Desire Lake Creek.

Chum Salmon

Chum salmon numbers have experienced dramatic declines in the Outer District since the peak harvest years of the late 1970's and early 1980's. Large returns were once again not expected in 1996 due to a succession of poor returns over the past several seasons. No specific commercial openings targeting chum salmon occurred in 1996, and the harvest of three incidentally caught fish (Appendix Table 21) was the lowest ever recorded during the last 20 years in this district.

Escapements into the three monitored chum salmon systems in the Outer District were relatively weak, with all failing to achieve their goals. Port Dick (head end) Creek fell short of its 4,000 chum escapement goal by 1,700 fish (Appendix Table 25). Island Creek chum escapement totaled 6,900 fish, 30% shy of the lower end of the escapement goal range of 10,000 to 15,000 fish, while Rocky River escapement amounted to 2,000 chum salmon, well short of the goal of 20,000 fish but still the second highest number for this species during the last 10 years.

Eastern District

Sockeye Salmon

The Eastern District had potential for harvestable surpluses of sockeye salmon in Aialik and Resurrection Bay Subdistricts during 1996, with a district-wide preseason projection of up to 163,000 fish. However, the failure of an enhanced return to Grouse Lake in Resurrection Bay and a smaller than expected return of sockeyes to nearby Bear Lake resulted in a total catch of 44,900 sockeyes (Appendix Tables 13 and 14) in the Eastern District, similar to last year's harvest and the third highest total during the last 20 years. About 18% of this total was taken as hatchery cost recovery at the Bear Lake weir (Table 1).

At Bear Lake, near Seward in the Resurrection Bay Subdistrict, sockeye enhancement activities by CIAA fostered optimism for a total return ranging up to 84,000 fish assuming optimum survival of various smolt and fry releases. Based upon the expected long-term increase of sockeyes returning to this system, a Resurrection Bay Management Plan was drafted during the winter of 1991-92. This plan allows the seine fleet opportunity to begin fishing on the Bear Lake sockeye run at a relatively early date in the outer reaches of Resurrection Bay in order to promote product quality. In addition, several modifications to the plan, to be implemented by emergency order in 1996, were drafted through a consensus of the staff and representatives of the seine fleet during the previous winter. The first change increased fishing time from two 40-hour periods per week to a single five day period. Based on observations made during the 1995 fishery, it was felt that this increase would allow greater opportunity to harvest sockeyes without jeopardizing the escapement goal for Bear Lake, set at 5,000 to 8,000 fish in the Trail Lakes Hatchery Annual Management Plan. Next, new closed waters markers were erected at the mouth of the Resurrection River to better define the river's mouth and the boundaries of fishing, which had been problematic during recent years. Finally, a new section of closed waters along the west side of Resurrection Bay between Caines Head and the city of Seward was implemented in order to protect returning chinook salmon, which are allocated entirely to the sport fleet and are illegal to retain in the commercial fishery by regulation.

This season, in keeping with the Resurrection Bay Management Plan, the entire Resurrection Bay Subdistrict, up to a point one mile due south of Cape Resurrection and Aialik Cape, was opened to seining by emergency order beginning on Monday, May 13. Despite presumption of an early run timing for this enhanced run (since brood stock utilized for the project had a documented run timing peaking in early June), the first three years of adult returns from 1992 through 1994 actually trickled in over the course of two months. In 1995, with larger numbers of adults returning, the majority of the run appeared in waters at the head of Resurrection Bay during the first two weeks of June. When the area first opened in 1996, no effort occurred in the outer areas of the subdistrict as the fleet once again adopted the now-standard "wait-and-see" attitude, hoping to locate fish nearer to the head of the bay before assessing run strength. However, the larger 1995 return, coming on the heels of disappointing returns from 1992

through 1994, caused at least a few fishermen to show increased optimism in 1996 by scouting the head of Resurrection Bay beginning about a week after the opening date. The first landing occurred on May 27, and word quickly spread that there appeared to be reasonable numbers of fish present. Effort steadily increased that week, and by the start of the next week, about a dozen seiners were actively plying the waters of Resurrection Bay for Bear Lake sockeyes.

The peak seine catch of the season in Resurrection Bay occurred over the course of two days on June 11 and 12 when eight to ten vessels harvested a total of nearly 7,200 sockeyes. By that time, the cumulative seine harvest totaled nearly 26,000 sockeyes, while escapement rates at CIAA's Bear Creek weir were considered adequate and limited cost recovery harvest was occurring. The liberalized fishing schedule and relatively steady catches kept effort fairly constant, but catch rates began to drop somewhat after these two peak days. Following a weekend closure on June 15-16, a small "buildup" of fish resulted in the season's single high daily harvest of 3,800 sockeyes on June 17. Catches dropped dramatically after that date, yet effort continued at a reduced level until July 1, with the final commercial seine harvest totaling 35,900 sockeyes (Table 3). When combined with the hatchery cost recovery harvests of 7,900 sockeyes from the Bear Creek weir, the cumulative Resurrection Bay catches totaled 43,900 fish (Appendix Table 14), nearly identical to 1995's harvest and the second highest catch from these waters since 1969. Counts at the Bear Creek Weir facility amounted to 8,000 sockeyes for escapement (Appendix Table 23), similar to the previous year's total. Also comparable to the previous four seasons, sockeye entry into fresh water was rather protracted, beginning on the first day of June and continuing through the end of July.

At Aialik Lake in the Aialik Subdistrict, aerial surveys were begun on June 27 with an estimate of 600 sockeyes present in the outlet stream of the lake at that time. Although no fish were noted in the lake itself on this first survey, several seals were observed within that body of water, suggesting that sockeyes were actually present. The next survey on July 5 showed a significant increase to 2,600 sockeyes in fresh water, achieving the escapement goal of 2,500 to 5,000 fish established for the system. Therefore, Aialik Subdistrict, including waters of Aialik Lagoon, were opened to seining five days per week beginning July 8. Despite the liberal fishing schedule

and open waters, the opening attracted little effort, and fishermen harvested only 1,000 sockeyes (Table 3, Appendix Table 14) over the course of the next week, with the majority taken on the first day. Subsequent flights through July noted a slight increase in escapement into Aialik Lake, with a final estimate of 3,500 sockeyes (Table 3, Appendix Table 23).

Pink Salmon

A harvestable surplus of up to 61,000 pinks was forecast in Eastern District waters for 1996, but this projection was questionable due to weak returns in some recent years. Although surveys of Resurrection Bay systems were limited to on-grounds estimates in mid-August, results suggested returns were generally fair to poor overall, depending on individual systems. At Bear and Salmon Creeks, where the combined pink escapement goal is 15,000 fish, a total of only 8,000 pinks was estimated (Appendix Table 24). The figure for Thumb Cove, with a goal of 4,000, was estimated at 9,500 pinks, while at Humpy Cove (2,000 goal) 3,400 fish were estimated. Tonsina Creek produced an estimate of only 400 pinks, far short of the 5,000 fish escapement goal. Due to the variability of returns and the limited assessment, no openings for pinks were allowed in Resurrection Bay and therefore no harvest resulted.

Aialik Subdistrict, originally opened to fishing five days per week on July 8 for sockeye salmon, was never closed after the sockeye run was effectively over. During recent years, the subdistrict was allowed to remain open despite knowledge that fishermen were fishing the outer areas later in the season, targeting pink salmon bound primarily for Prince William Sound. The staff elected to leave the area open again in 1996 because the relatively modest catches in prior years did not threaten either local or non-local stocks. Unlike recent seasons, however, no vessels traveled to this open subdistrict late in the season, and no resulting harvest occurred.

Other Species

Chum salmon are the only other commercially important species in the Eastern District, but harvests during the previous six years have been dismal. This season's chum harvest amounted

to 220 fish (Table 6, Appendix Table 21), with nearly all fish taken incidentally in Resurrection Bay during the Bear Lake sockeye salmon fishery. An estimated 3,700 chums were estimated as escapement into Tonsina Creek (Appendix Table 25).

Coho salmon are not normally a commercially important species in the Eastern District but are an integral component of an enhancement project which benefits sport fishermen in area waters. A portion of the returning adults from this project are harvested at the Bear Creek weir by CIAA as cost recovery for expenses incurred. In 1996, a total of 2,600 cohos were harvested for hatchery cost recovery (Table 4). An additional 1,300 cohos were also entered into the Seward Silver Salmon Derby. It should be noted that all coho salmon entered into this Seward sport fishing derby are subsequently sold by the city of Seward, organizer of the derby, to a commercial processor. Therefore, these catches are considered "commercial harvests" and are listed in the commercial catch tables to document this fact. Total catch for the season in the entire Eastern District amounted to just over 3,900 cohos (Table 4, Appendix Table 17).

SALMON ENHANCEMENT AND REHABILITATION

Introduction

Fisheries enhancement has played a major role in LCI salmon production during recent years. Natural adult salmon returns to the LCI area continue to demonstrate wide fluctuations, often the result of environmental impacts such as flooding or ice scouring on spawning grounds. Since their inception in the mid-1970's, enhancement and rehabilitation projects have made significant contributions to both commercial and sport fishing harvests. These contributions have historically ranged from 24% to 90% of the entire LCI commercial salmon harvest and are expected to remain high in future years.

Projects initiated by the ADF&G and presently being undertaken by CIAA and/or CRRC provided an estimated 78% (719,000 salmon) of the total 1996 LCI commercial harvest of

919,799 fish. The Leisure/Hazel, English Bay, Kirschner, Bear, and Bruin Lakes sockeye salmon enhancement projects produced approximately 64% (288,200 fish) of the total LCI record-setting sockeye harvest of nearly 450,000 fish in 1996. Tutka Lagoon Hatchery production accounted for almost 95% (426,900 fish) of the 1996 LCI commercial pink salmon harvest of 451,500 fish.

Using average weights per fish and average prices per pound in LCI, the estimated contribution of ADF&G/CIAA/CRRC-produced salmon was 62% (\$1.406 million) of the \$2.287 million total value of the 1996 LCI commercial salmon harvest. About 11% (\$258,100) of the total exvessel value of the fishery was utilized for hatchery cost recovery purposes (Table 7). A brief description of the current enhancement projects in LCI follows. Further information on enhancement in LCI can be found in ADF&G Regional Information Report #2A97-06.

Tutka Lagoon Hatchery

The Tutka Lagoon Salmon Hatchery/Rearing Facility was constructed in 1976 with an initial production capacity of 10 million salmon eggs, but expansion over time, including work during the winter of 1993-94, has increased its capacity to the present level of approximately 150 million eggs. Pink salmon have been the primary species produced at the hatchery, while secondary chum enhancement has been discontinued in favor of recent efforts directed toward sockeye salmon. Presently the hatchery has a sockeye egg capacity of 1.8 million eggs, while raceways are also in place to accommodate the resulting fry.

In 1996 the adult pink salmon produced by Tutka Lagoon Hatchery totaled approximately 568,600 fish returning to the hatchery site (Table 9). No attempt was made to separate the contribution resulting from natural spawning in Tutka Creek. The estimated 0.9% overall survival rate was the second lowest in the facility's history and far lower than the average for short-term reared fry only of roughly 5.5%. The commercial harvest, including cost recovery, of 426,100 pink salmon from Tutka Bay and Lagoon (Table 9), accounted for approximately 96% of the pink salmon landed in the Southern District and 94% of the entire LCI commercial

pink salmon harvest. Pinks taken for hatchery cost recovery purposes from the Tutka Bay Subdistrict totaled 419,200 fish, worth approximately \$93,300 (Table 7), far short of CIAA's revenue goal of \$450,000. Approximately 105.0 million short-term reared pink salmon fry were released into Tutka Bay in 1996 (Appendix Table 30). In addition, approximately 70,000 sockeye salmon smolts were direct-released from the hatchery this past season, the first such release of this species in the history of the facility.

Leisure and Hazel Lakes Sockeye Salmon Stocking

Leisure Lake, also called China Poot Lake, historically was a system barren of sockeye salmon. A study initiated in 1976 involved the stocking of hatchery-produced sockeye salmon fry to determine optimum stocking levels prior to and after lake enrichment through fertilization. Because a barrier falls below the lake prevents upstream migration and precludes any adult spawning, it is desirable to harvest all returning adult fish in the terminal harvest area, China Poot Bay. Beginning in 1988, a similar sockeye stocking program was initiated at Hazel Lake, which empties into Neptune Bay and is located approximately three miles south of Leisure Lake. Since the initiation of these projects, nearly 1.4 million adult sockeyes are estimated to have returned as a result of the stocking programs (Appendix Table 15), making a significant contribution to the commercial and recreational sockeye harvests in the Southern District.

Because of the close proximity of the two terminal harvest areas, and the absence of a mark/recovery program, adult returns to Leisure and Hazel Lakes cannot be separately identified through sampling within the commercial catches and are therefore presented as a combined total. The cumulative total sockeye return to Leisure and Hazel Lakes in 1996 was estimated to be 210,400 fish (Figure 11, Appendix Table 15), nearly three times the 1979-95 average and more than twice the recent 10-year average (which included returns to Leisure Lake only during the years 1986 through 1990). The cumulative commercial harvest of 200,000 fish comprised over half of the Southern District sockeye harvest and about 45% of the total LCI sockeye salmon harvest.

Approximately 1.49 million sockeye salmon fry were released into Leisure Lake in 1996 (Appendix Table 30), the second year of reduced-density stocking for this system after 10 consecutive years of high-density stocking from 1984 through 1993 (no fry were stocked in 1994 due to an IHN virus outbreak at Crooked Creek Hatchery). At Hazel Lake, 1.03 million sockeye fry were stocked in 1996.

Halibut Cove Lagoon Salmon Enhancement

Pink Salmon

Pink salmon enhancement at Halibut Cove Lagoon was initiated in 1986 as a cooperative program between CISA, CIAA, and ADF&G. Pink salmon fry were transported from Tutka Hatchery to Halibut Cove Lagoon where they were held in floating net pens and fed for 30 days before release. The goal of this project was to disperse fry releases from the Tutka Hatchery over more underutilized rearing areas. It also served to disperse the commercial seine fleet over larger areas. Since there is no suitable spawning habitat available at Halibut Cove Lagoon, all returning adult fish were targeted for harvest in the commercial seine and set gillnet fisheries. Stocking of pink salmon fry into Halibut Cove Lagoon was discontinued after the 1993 season, so no adults returned to this site in 1996. The last harvest as a result of this project occurred in 1994.

Chinook Salmon

The chinook salmon enhancement project at Halibut Cove Lagoon involves the release of chinook salmon smolts, with the objective of increasing sport fishing opportunities in Kachemak Bay. This is the oldest and one of the most popular sport fishing enhancement projects in LCI, operating continually with an annual release of smolts since 1979. An estimated 1,620 adult chinook salmon returned to Halibut Cove Lagoon in 1996.

Although adult returns from the Halibut Cove Lagoon stocking program are not intended for commercial harvest, there is incidental harvest of these chinook salmon in the commercial set gillnet and seine fisheries. In 1996 the incidental harvest by commercial fishermen was estimated at 420 fish or approximately 26% of the total return, less than the estimated long-term average of about 34%. The majority of the 1996 catch was taken by set gillnetters at around 87%, while seiners harvested the remaining 13%.

Chenik Lake Sockeye Salmon Stocking

Chenik Lake, located in Kamishak Bay, historically was an excellent sockeye producer prior to the 1940's when annual runs approached 150,000 fish. Since that time, however, sockeye runs declined dramatically, forcing a complete closure of the Chenik area fishery beginning in 1952. By the mid-70's the average annual return to this system was less than 500 fish.

In 1978 ADF&G initiated a program to re-establish the sockeye returns and subsequently increase commercial fishing opportunities in the Kamishak Bay area. Sockeye fry from Crooked Creek Hatchery have been annually stocked in Chenik Lake since that time, and a fish pass was developed at the intertidal mouth of Chenik Creek, alleviating a partial migrational barrier. Since 1987, lake enrichment has occurred through the application of liquid fertilizer, but not on an annual basis.

Increased sockeye escapements in the early 1980's augmented subsequent production, and the Chenik area was reopened to commercial fishing. Returns have accounted for up to 50% of the total LCI commercial sockeye harvest in some recent years, approaching the historical record high runs of the 1930's.

The 1996 sockeye return to Chenik Lake was the third consecutive failure, with no commercial harvest and a documented escapement of only 2,990 adults (Figure 12, Appendix Table 16). The primary reason for the low return, which was once again expected, continued to be the lingering effects of Infectious Hematopoietic Necrosis Virus (IHNV), a disease commonly

affecting juvenile salmon and trout. IHNV was documented in the Chenik system during the 1991, 1992, and 1993 smolt outmigrations. It is suspected of causing increased mortality to juvenile sockeyes and therefore reducing the adult returns. A thorough investigation of the relationship between the Chenik Lake sockeye stocking project and the IHNV problem was initiated during the winter of 1992-93, ultimately resulting in a staff recommendation to reduce fry stocking densities from peak levels occurring in 1989 and 1990.

The outmigration of sockeye smolts at Chenik Lake has been monitored in recent years through use of a weir and live trap. Total outmigration in 1996 was 12,700 smolts, nearly identical to 1995's count, making it the second lowest number in any of the last six years. Despite the low numbers, it is worth noting that outmigrating smolts showed negligible signs of the IHN virus for the third successive year, perhaps signaling a continuation of this system's recovery.

The factors relating to IHNV epizootics are very complex and currently not well understood. Although remotely possible that stocked sockeye salmon fry were the source of the virus, a more likely cause is that Chenik Lake has become a reservoir for IHNV released from the sex products of naturally spawning adult sockeyes or their decomposing carcasses. It has been hypothesized that the tremendous population declines experienced by the sockeye stock at Chenik Lake in the late 1930's and 1940's may have resulted from IHNV epizootics caused by record high escapements of up to 53,000 adults in the 1930's.

Unfortunately, there is no known practical onsite treatment of IHNV other than perhaps decreasing fry stocking densities, which was begun in 1993 with a reduction to just over one million sockeye fry (Appendix Table 30). This experiment was inadvertently stretched to its maximum limit by default in 1994 when no hatchery-produced fish were released into the system. The fry from Crooked Creek Hatchery which were slated for stocking at Chenik Lake that year were destroyed due to an outbreak of the IHN virus at the hatchery facility. It should be noted that this was the first documented incidence of IHNV at the Crooked Creek facility in 23 years of operation. Stocking resumed in 1995 with the release of 1.13 million sockeye fry into Chenik Lake, while just under 1.0 million fry were stocked in 1996 (Appendix Table 30).

Cutting back the adult escapement should also theoretically decrease transmission of IHNV into the littoral zone of Chenik Lake. Adult escapement into Chenik Lake, once again enumerated through the use of a counting weir at the lake outlet in 1996, totaled only 2,990 fish, far short of the 10,000 fish goal (Appendix Table 23). The escapement shortfall, when combined with the reduction in supplemental stocking, equates to reduced fry production in 1996, which in turn may actually benefit the system by reducing the potential for IHNV epizootics.

The Department and CIAA are currently reviewing future stocking levels and potential for further fertilization of Chenik Lake. It is anticipated that the numbers of returning adult sockeye will remain depressed in the near term because of the IHNV problem within the system.

English Bay Sockeye Salmon Rehabilitation

The English Bay Lake system has the only significant stock of sockeye salmon native to the Southern District of LCI. Unfortunately, the English Bay sockeye returns declined to their lowest recorded levels in the last half of the 1980's decade. Sockeye escapement estimates between 1985 and 1993 ranged from 2,500 to 8,900 fish; all but one of these years (1993) was well below the 20-year average of 7,800 fish (Appendix Table 23). The decline of the English Bay sockeye run resulted in a very restrictive management strategy for this area. The commercial, sport, and subsistence fisheries were closed during the sockeye run for most years mentioned. Efforts to rehabilitate this depressed stock were initiated by ADF&G with an egg take in 1989 and the subsequent release of 350,000 sockeye salmon fry in 1990 (Appendix Table 30). Chugach Regional Resources Commission, in cooperation with the village of Nanwalek (formerly English Bay) and the Bureau of Indian Affairs, has since taken over this enhancement project and continued egg collections, fry stockings, and operation of a smolt/adult enumeration weir.

Whereas the escapement figures for English Bay Lakes prior to 1994 were index estimates based on aerial surveys, the 1994 escapement was monitored for the first time through the use of a counting weir, operated by Chugach Regional Resources Commission. The final total that

year numbered 13,800 sockeyes (Appendix Table 23), the highest return since 1982 and the first year since 1984 in which the minimum desired goal of 10,000 fish was achieved. In 1995, escapement into English Bay Lakes, tallied once again by weir, amounted to 22,500 sockeyes, the highest total over the past 20 years.

Optimum escapement for this system recently has been estimated to be less than the published maximum goal of 20,000 sockeyes (Edmundson et al. 1992). A plan to tightly control spawning escapement into the lake by harvesting those fish surplus to the maximum desired goal of 15,000 was adopted by ADF&G staff, representatives of CRRC, and village residents from Nanwalek during meetings held over the winter of 1995-96. Based on a preseason forecast of up to 23,000 returning adults in 1996, the subsistence, commercial, and sport fisheries in the Port Graham Subdistrict were allowed to target on English Bay sockeyes from the beginning of the run, whereas in recent years those fisheries had been kept closed until run strength could be assessed. Both the commercial and subsistence set gillnet fisheries were open to fishing on the standard two 48-hour periods per week in 1996, with the commercial fishery starting on the first Monday in June by regulation. Despite the optimistic projection, escapements were lagging into the second week of the month, and the commercial set gillnet fishery was closed on June 17.

In response to the closure, escapement counts at the weir began to increase, with a daily count of over 3,900 sockeyes on June 23 boosting the cumulative total to nearly 8,400 fish, which represented over half of the desired goal of 15,000 fish. As a result, the commercial set gillnet fishery was reopened on June 25. Because the return appeared to be gaining strength, a Special Harvest Area (SHA) was concurrently opened in a limited section of fresh water downstream from the weir so that Port Graham Hatchery Corporation (PGHC) could conduct cost recovery harvests seven days per week. By July 1, escapements had increased to 9,300 sockeyes, while cost recovery had netted an additional 2,800 fish, and significant numbers were reportedly building downstream of the weir. Because all indications still suggested a strong return, fishing time for the set gillnet fishery in waters of Port Graham Subdistrict was extended to five days per week beginning July 3.

Through the first week of July escapement counts at the English Bay weir appeared reasonable, but after that they began to decline precipitously despite voluntary cessation of cost recovery harvest on July 5. By July 16, the cumulative escapement count totaled 12,100 fish, and historical run timing suggested that the run was nearly over. In a final effort to achieve the 15,000-fish goal, the commercial set gillnet fishery in Port Graham Subdistrict was once again closed to fishing beginning July 17. The closure proved too late however, as escapements did not significantly increase after the closure. The final count past the weir totaled 12,380 sockeyes, or just over 82% of the desired goal. When combined with the commercial and hatchery harvests, the estimated return to the English Bay Lakes systems was 25,300 sockeyes (Table 3). Since subsistence set gillnet harvests in the Port Graham Subdistrict (Appendix Tables 28 and 29) were presumably comprised of a high percentage of English Bay sockeyes, the total return was estimated to be about 27,100 with the addition of these fish.

Approximately 155,000 sockeye fry (Appendix Table 30) were released into English Bay Lakes in the late fall/early winter via a long-term net pen rearing operation. An estimated 2.2 million sockeye eggs were collected in 1996 for incubation at Port Graham Hatchery during the winter of 1996-97. However, incubation problems reportedly resulted in a very high mortality for these eggs and survival rates are in question.

Bear Lake Sockeye Salmon Enhancement

Bear Lake, located at the head of Resurrection Bay in the Eastern District, has been the target of sockeye salmon enhancement efforts over recent years. In addition, this system has been the centerpiece of a Division of Sport Fish coho salmon enhancement program since 1962, part of which included limiting the escapement of sockeye salmon into the lake. As a result, only a small remnant run of naturally spawning sockeye salmon remained at Bear Lake. In an effort to produce increasing numbers of adult sockeyes without adversely affecting coho salmon production, as mandated by Board of Fisheries policy, CIAA undertook a sockeye stocking program beginning in 1989 with the release of 2.2 million sockeye fingerlings. Since then,

additional releases of both fingerlings and accelerated growth ("zero check") smolts have occurred, ranging from 0.2 to 2.4 million juvenile sockeye salmon each year (Appendix Table 30).

The first year of adult returns in 1992 was discouraging, with a total of less than 2,000 fish, but returns have increased during each successive season. The return in 1995 was the highest to date, totaling nearly 53,000 sockeyes, with common property seine harvest of about 24,000 fish. Based on survival rates experienced since inception of this project, the 1996 forecast projected a harvestable surplus of up to 76,000 sockeyes as a result of Bear Lake enhancement. In anticipation of the larger return, Department staff in consultation with seine fishermen invoked several modifications to the informal Bear Lake Sockeye Salmon Management Plan during the winter of 1995-96, one of which liberalized fishing time to five days per week. A second moved closed waters markers closer to the stream mouth of the Resurrection River. Unfortunately, the return was not as strong as expected, but the aforementioned modifications did allow more harvest opportunity for the seine fleet, resulting in a greater catch by that user group.

The total return to Bear Lake was estimated at 52,500 sockeyes (Table 3), with a common property harvest of about 36,000 fish or nearly 70% of the run. An additional 7,700 sockeyes were harvested at the Bear Lake weir as hatchery cost recovery, while the desired escapement goal of 8,000 fish was achieved. Approximately 864,000 sockeye fry were released into Bear Lake during 1996 (Appendix Table 30), while 1.481 million sockeye eggs were collected for incubation over the 1996-97 winter at Trail Lakes Hatchery in Moose Pass.

Other Sockeye Salmon Lake Stocking

Several other LCI lakes were stocked in 1996 with sockeye salmon fry produced by Crooked Creek Hatchery. At Kirschner Lake in the Kamishak Bay District, site of an ongoing fry stocking project since 1987, approximately 250,000 fry were stocked (Appendix Table 30).

Three other lakes, evaluated through pre-stocking studies conducted between 1986 and 1989, and which have been regularly stocked during recent years, received between 250,000 and 500,000 sockeye fry in 1996. The three lakes included Bruin Lake, Ursus Lake, and Upper Paint Lake, all in the Kamishak Bay District (Appendix Table 30). A fourth lake, Lower Paint Lake, had also been evaluated and stocked along with the previous three, but stocking was discontinued after 1995.

The seventh year of adult sockeye returns to Kirschner Lake occurred in 1996. Additional fish returned to nearby Bruin Lake, also stocked with sockeye fry. The overlapping harvest areas, and the absence of any tagged fish, precludes separation of the returns for purposes of enumeration. The total combined return to Kirschner and Bruin Lakes was 32,300 sockeyes (Table 3), short of the combined preseason forecast of 45,000 fish for the two systems. Of this total, approximately 650 sockeyes escaped the commercial fishery and were documented via aerial surveys in Bruin Lake Creek, prevented from reaching the lake by a barrier falls in the creek. The Kirschner Lake system has remained one of the steadiest producers of LCI stocked lakes since the inception of the program at that site. At nearby Ursus Lake in the Ursus Cove Subdistrict, a peak aerial count of 900 adult sockeyes was observed in 1996.

A relatively new sockeye enhancement project at Grouse Lake in Resurrection Bay of the Eastern District was expected to come on line in 1996, with a first-year adult return forecasted at up to 76,000 fish. All returning fish were designated for hatchery cost recovery in accordance with the Trail Lakes Hatchery Basic Management Plan. Brood stock for this project, from Packers Lake on Kalgin Island in Upper Cook Inlet, were selected for late run timing characteristics so as not to overlap with the earlier Bear Lake sockeye return. Unfortunately and for unknown reasons, the Grouse Lake return was an effective failure in 1996, with only about 800 adults documented. The project is scheduled to continue, however, and expectations for future returns are optimistic.

Paint River Fish Pass

The Paint River system in the Kamishak Bay District contains at least 40 kilometers (25 miles) of potential salmonid spawning and rearing habitat. Currently the Paint River system is barren of salmon because of a waterfall at tide line that was impassable prior to 1993. ADF&G and CIAA initiated feasibility studies for a fishway in 1979. CIAA received State and Federal grant funds to build the fishway, completing construction in the fall of 1991. ADF&G Commissioner Carl Rosier declared the fish pass officially operational in January 1993.

The Paint River Lakes were first stocked with sockeye fry in 1986 and annually since 1988 (except in 1994, when no fry were available) to test the feasibility of developing a sockeye salmon return to the fish pass project site. A combined total of 750,000 fry (Appendix Table 30) was released into Upper Paint Lake during 1996, while stocking of Lower Paint Lake was discontinued after 1995.

A peak of only 200 adult sockeyes was observed during aerial surveys of the Paint River mouth and Akjemguiga Cove during 1996, the sixth consecutive year of meager returns to this enhancement site. Because of the small numbers of returning fish, the fish pass was not opened to the migrating salmon and no freshwater escapement occurred.

Port Graham Hatchery

In an effort to supplement natural fish production and provide increased employment opportunities in the native village of Port Graham, the Port Graham Hatchery Corporation applied for and received a permit to operate a private non-profit (PNP) hatchery in 1992. Port Graham is located approximately 21 nautical miles southwest of Homer on the south side of Kachemak Bay (Figure 2). The hatchery had conducted experimental egg-takes and fry releases via a scientific/educational permit from 1990 through 1992, while these activities have since been permitted in the Port Graham Hatchery Basic and Annual Management Plans. Adult returns to the hatchery failed to appear in both 1992 and 1993 despite predictions of at

least moderate returns. Because no fry were released in 1993, both the forecast and actual return for 1994 were zero. The 1995 pink return to Port Graham Hatchery was forecasted at 20,000 to 50,000 fish, with the actual return totaling an estimated 20,000 pinks. In 1996, with a preseason forecast of 7,000 to 10,000 returning pinks, the actual return amounted to only 2,700 fish. Reasons for the poor returns are not fully understood, but the hatchery plans to continue fry releases in an effort to establish a successful pink salmon program.

The PNP permit for PGHC allows pink salmon brood stock collection from a natural run in the Port Graham River, at the head of Port Graham. However, the Port Graham River pink run historically has experienced significant natural fluctuations in escapements despite conservative fishing schedules, causing some concern for protection of the natural stocks. Consistent with the priority of managing for natural stocks (**AS 16.05.730**), a brood stock collection schedule based on the desired natural escapement into Port Graham River as well as historical escapement levels has been developed to offer maximum protection to the wild pink salmon stock during years of weak returns. In 1996, the hatchery collected only about 1,900 pinks for brood stock purposes (Table 5), all of which were harvested in salt water within close proximity to the hatchery due to the relatively weak natural returns to Port Graham River.

Harvest of returning hatchery stocks could potentially occur in commercial purse seine and set gillnet fisheries as well as a subsistence set gillnet fishery in Port Graham. Hatchery fish will likely intermix with wild stocks bound for the Port Graham River. Management decisions must address the effects of these various fisheries so as to afford protection to the natural stocks until adequate escapement into Port Graham River is achieved. A small natural return of chum salmon to Port Graham River also occurs, and since this run has been depressed in recent years, management measures must strive to protect this species as well.

The approved Port Graham Hatchery Basic Management Plan designated a Special Harvest Area (SHA) to allow for brood stock collection and cost recovery harvest (Figure 8). The

SHA was designed to provide a migration corridor on the northeast side of the bay for wild stocks traveling to Port Graham River at the head of the bay. Restricting the harvest in Port Graham to the SHA is expected to afford some limited protection to the natural spawning stocks of pink and chum salmon. Once hatchery brood stock and cost recovery requirements are met, remaining surpluses may be harvested by the common property fishery inside the SHA. However, no guarantee of brood stock and/or cost recovery can be assumed. Fishing time will be restricted until the fish become spatially segregated or until adequate escapements are achieved in the river.

Although all efforts prior to 1993 were directed towards pink salmon, sockeye salmon production is now underway at the Port Graham Hatchery. The facility has incubated sockeye salmon eggs collected from English Bay Lakes, destined for release back into that system, since 1993. Formerly eggs from this collection site were incubated at Big Lake Hatchery near Wasilla.

Important Changes

One notable occurrence regarding enhancement activities during 1996 warrants documentation. CIAA announced and implemented a closure of Crooked Creek Hatchery late in 1996. Crooked Creek Hatchery has been responsible for a significant portion of the enhanced sockeye salmon production in LCI for nearly two decades. Because of the closure, CIAA will conduct incubation and rearing of Tustumena-stock sockeye eggs and fry intended for LCI lake stocking at their Eklutna Hatchery, located on Knik Arm near Anchorage in Upper Cook Inlet. For major systems, stocking of fry into LCI lakes should continue with only minor "behind-the-scenes" logistical changes necessary to accommodate the shift in facilities. Stocking at selected smaller systems which have not produced desired results in recent seasons, such as Ursus, Bruin, and Lower Paint Lakes, has been suspended but may resume depending on future fiscal considerations within CIAA.

The Department's head geneticist has recently determined that Tustumena Lake sockeye salmon may no longer be utilized as brood stock for any projects other than those already underway. Therefore, future sockeye salmon enhancement projects which may be undertaken in LCI must utilize brood stock from another source. Stocking projects at Leisure, Hazel, Chenik, Kirschner, Bruin, Ursus, and Paint River Lakes have traditionally used sockeye salmon brood stock from Tustumena Lake.

1997 COMMERCIAL SALMON FISHERY OUTLOOK

Sockeye Salmon

Adult sockeye salmon returns to all LCI systems in 1997 could approach 343,000 fish, 24% less than the record 450,000 fish landed in 1996 but still 50% greater than the average annual catch of 228,000 sockeyes during the last decade. If realized, this harvest would be the second highest ever for sockeye salmon in LCI, lower only than last season's. Approximately three-fourths of the total sockeye harvest should be a result of continuing enhancement and lake stocking projects in LCI. However, this projection could be somewhat misleading in that nearly half of the entire harvest is projected to return to Grouse Lake in Resurrection Bay and is therefore allocated specifically for hatchery cost recovery in accordance with the Trail Lakes Hatchery Basic Management Plan. In addition, all LCI lakes which rely on Crooked Creek Hatchery for sockeye fry stocking, except for Kirschner Lake, are expected to experience severely reduced adult returns in 1997 due to a total lack of stocking during 1994. Nearly all sockeye fry at Crooked Creek Hatchery were destroyed that year because of an IHNV outbreak.

Despite beneficial fertilization of Leisure Lake during recent years, 1997 sockeye returns are expected to be poor due to the absence of stocking in 1994, with a projected return of only 3,500 sockeyes to China Poot Bay. An additional 2,000 sockeyes are expected to return to Neptune Bay, once again due to lack of stocking at Hazel Lake in 1994.

No harvest is expected to occur at Chenik Lake in 1997. Despite annual stocking of up to 1.4 million sockeye fry, an IHNV epizootic apparently caused significant mortality to juvenile sockeyes and reduced the numbers of emigrating smolt from the system in recent years. The 1994 - 1996 adult returns appear to have displayed the most significant effects of the IHN outbreak as escapements into Chenik Lake have ranged from only 800 to 2,990 fish during those years. Smolt outmigration data from the Chenik enumeration weir suggests that the 1997 return could be equally as poor. Additionally, fry which would have contributed to adult returns in 1997 were not stocked in 1994 due to an IHN outbreak at Crooked Creek Hatchery, further increasing the likelihood of an extremely weak return.

Adult sockeye returns to Kirschner Lake have been relatively encouraging and consistent over the past three seasons, leading to a forecast of 27,500 fish in 1997. Kirschner Lake was the only LCI lake to benefit from the stocking of fry from Crooked Creek Hatchery in 1994. Bruin Lake, also in the Kamishak Bay District, has been stocked annually with sockeye fry since 1990 (except for 1994), while nearby Ursus Lake has received fry annually since 1992 (once again except for 1994). No fish are expected to return to either system in 1997. Despite stocking Paint River Lakes with 750,000 sockeye salmon fry in 1992 and 1993, and no fry in 1994, no harvestable surplus of adult fish is forecast for 1997 based on poor returns from similar stocking levels at this system in recent years.

The sixth year enhanced sockeye return to Bear Lake in 1997 is expected to be less than that experienced during the last two seasons, with a harvest forecast of 35,000 fish. Analysis of recent returns to Bear Lake, as well as a re-analysis of smolt outmigration data, resulted in this reduced forecast for the 1997 return. On the other hand, Grouse Lake, also near Seward in Resurrection Bay, is expected to experience a much greater second year adult return as a result of enhancement activity, with estimates ranging as high as 166,000 sockeyes. Since brood stock for this project was selected specifically for late run timing, it is hoped that the Grouse Lake return will peak in late July or early August and therefore not overlap with the much earlier run timing of Bear Lake sockeyes. As previously stated, the Grouse Lake return is

designated entirely for CIAA hatchery cost recovery and no common property harvest of these fish is anticipated.

Natural sockeye return projections for LCI are based solely on average historical harvests and could be expected to contribute up to 91,600 fish to commercial catches in 1997. Despite not reaching expectations during recent years, runs of naturally produced sockeye have been improving slightly, with a concurrent improvement in spawning escapement to most systems. The Southern District is expected to contribute the most to the harvest of natural stocks, while additional catches could come from the East Nuka Bay systems of Delight and Desire Lakes in the Outer District, Aialik Lake in the Eastern District, and Mikfik Lake in the Kamishak Bay District.

Pink Salmon

Harvest of pink salmon in Lower Cook Inlet during 1997 could reach 3.1 million fish, with enhanced production expected to provide almost 80% of the total. However, if prices for this species continue to remain severely depressed, it is unlikely that the harvest forecast will be achieved even if returns are strong. The Tutka Hatchery, in the Southern District, is expected to contribute up to 2.5 million pinks to commercial harvests. However, due to the extreme fiscal deficit incurred at the Tutka Hatchery last season because of the weak run and depressed prices for pinks, much if not all of the pink return will be necessary to meet the hatchery's revenue goal in 1997.

Natural spawning escapement levels into most major LCI systems were generally good in 1995, contributing to a harvest projection of 636,000 naturally produced pinks throughout the entire LCI management area. West side systems are expected to harbor the greatest potential for harvest with a combined total of over 350,000 pinks projected for Bruin Bay, Rocky Cove, and Ursus Cove drainages. Port Dick and East Nuka Bay in the Outer District are expected to have substantial harvestable surpluses, while Resurrection Bay could also see a relatively

strong run. Both Humpy Creek and Seldovia River in the Southern District should also experience returns that will allow commercial fishing effort.

Chum Salmon

Based solely on recent years' average harvests (after 1988), the total LCI commercial chum salmon catch could be as high as 12,000 fish during 1997. The LCI chum harvest will consist exclusively of natural production since chum salmon enhancement is no longer conducted in LCI. Despite optimism for chum salmon during recent years, actual harvests during the past seven seasons have failed to meet the preseason projections by substantial amounts, suggesting that the average used to generate the forecast may be overly optimistic for 1997 as well.

Chinook and Coho Salmon

No formal harvest forecast is prepared for chinook or coho salmon in LCI. However, average annual harvests since 1980 indicate that about 1,600 chinook and 13,300 coho salmon can be expected to contribute to LCI commercial harvests in 1997.

The following table summarizes the projected harvest figures by species in the Lower Cook Inlet management area during 1997:

Species	Harvests of Enhanced Returns	Harvests of Natural Returns ^a	Total Harvest
Chinook	^b	1,600	1,600
Sockeye	251,000 ^c	91,600	342,600
Coho	^b	13,300	13,300
Pink	2,475,000 ^c	636,300	3,113,000
Chum	0	11,700 ^d	11,700
TOTAL	2,726,000	754,500	3,480,500

^a Harvest forecasts for naturally produced chinook, sockeye and coho salmon are simply average commercial harvests during the years 1980 - 1996.

^b Returns of chinook and coho salmon as a result of enhancement projects in Lower Cook Inlet are intended for recreational fisheries but are expected to contribute to commercial catches.

^c Includes common property plus cost recovery harvests.

^d Harvest forecast for chum salmon is the average commercial harvest since 1989.

SUBSISTENCE AND PERSONAL USE SALMON NET FISHERIES

KACHEMAK BAY PERSONAL USE FISHERY

The Southern District (Kachemak Bay) fall coho salmon gillnet fishery dates back prior to statehood under varying names, being known as a "personal use" fishery during the years 1986-1990, 1993, and 1995, and as a "subsistence" fishery in 1991, 1992, and 1994. Numerous court rulings have affected the status of this fishery over the past 15 years. Board of Fisheries actions during the fall 1992 meeting, creating a personal use fishery for the 1993 season, were voided by subsequent court action after the season, resulting in a subsistence fishery for the 1994 season. Yet another court action after the 1994 fishery reestablished the "subsistence" and "non-subsistence" areas originally created by the Board in 1992, and because most of Kachemak Bay was included in a "non-subsistence" area, the subsistence fishery and the regulations governing it were no longer valid. The Board responded by re-adopting personal use regulations governing this fishery into permanent regulation for the 1995 season and rescinding the subsistence regulations formerly governing the fishery. These personal use regulations carried over into the 1996 season as well.

The target species in the Kachemak Bay gillnet fishery is coho salmon, with returning fish a mixture of natural stocks bound primarily for the Fox River drainage at the head of Kachemak Bay and enhanced runs bound for the Homer Spit fishing lagoon and Fox Creek near the head of Kachemak Bay. The regulations governing the fishery are found in the Personal Use Coho Salmon Fishery Management Plan (**5 AAC 77.549**), which directs the Department of Fish and Game to close the fishery when an estimated 2,500 to 3,500 coho salmon are harvested. This amount was determined by the Board to be appropriate after reviewing historical harvests in years prior to enhancement.

Although the Board of Fisheries did not consider any proposals dealing directly with the personal use fishery at their most recent meeting in November of 1995, they did adopt another

proposal which affected this fishery. The Board created a new subsistence gillnet fishery in the Seldovia Bay area beginning with the 1996 season, and in doing so directed the Department to deduct any coho salmon caught in that fishery from the guideline harvest range for the personal use fishery. All other regulations from the previous two years' fisheries remained essentially unchanged for the 1996 personal use fishery. The regulatory opening date for the fishery was August 16. Legal gear was limited to a single set gillnet not exceeding 35 fathoms in length, 45 meshes in depth, and 6 inches in mesh size. Nets were not permitted more than 500 feet from the mean high water mark, and a net could not be set offshore of another net. A permit from the Homer office was required, with an Alaska resident sport fishing license necessary to obtain a permit. The seasonal limit was 25 salmon per head of household and 10 additional salmon per each dependent. There were two 48-hour scheduled fishing periods each week, from Monday 6:00 a.m. until Wednesday 6:00 a.m. and Thursday 6:00 a.m. until Saturday 6:00 a.m.

Since no coho salmon harvest was reported from the early August Seldovia subsistence fishery, the guideline harvest range remained at 2,500 to 3,500 fish for the personal use fishery. The regulatory opening date of August 16 for the personal use fishery fell on a Friday during 1996, which was the middle of a regularly scheduled weekly fishing period. If allowed to open by regulation, the fishery would have begun at 12:01 a.m., during darkness. Because the staff felt that such an opening would cause difficulty for participants in determining minimum distances between nets, and would also make enforcement impractical, the opening was delayed by emergency order until 6:00 a.m. Friday, August 16. The first fishing period therefore lasted 24 hours, until 6:00 a.m. Saturday, August 17, which marked the end of a normal weekly fishing period.

Prior to the opening, the Department requested voluntary daily reporting from each permit holder during the fishery, as has been the case for the last several years. Based on those voluntary reports through the first 24-hours of fishing, early reports from the second fishing period, and fishery performance data from the previous five years, the staff estimated that the guideline harvest range would be achieved by the end of the second (48-hour) open fishing

period which began at 6:00 a.m. Monday, August 19. Therefore, an emergency order was issued closing the fishery effective at 6:00 a.m. Wednesday, August 21, for the remainder of the season. Total fishing time allowed was 72 hours.

A total of 299 permits was issued in 1996, representing a slight increase over the previous two years and breaking a trend of declining numbers of permits issued since 1990 (Appendix Table 27). Actual fishing effort was similar to the last four years but represented only about 45% of the peak-level experienced in 1990 (Appendix Table 26). A total of 293 permit holders (98%) reported their catches through returned permits. Of this number, 213 permit holders (71%) actively fished, 80 (27%) did not fish at all, and the remaining 6 permits holders (2%) did not report. Based on permits actually returned, the harvest was estimated to be 3,347 coho salmon (Appendix Table 26), 1,022 pink salmon, 102 sockeye salmon, 302 chinook, and 24 chums. Anecdotal information suggests that net-sharing was a common occurrence among permit holders, as is the case in most years.

The 1996 Southern District personal use fishery was the shortest on record, equaling that of the 1994 fishery with a total of 72 hours actual fishing time. The staff made a concerted effort prior to the opening to inform the public of the anticipated short duration of the fishery. As in recent years, this prior knowledge of the brevity of the fishery led to intense competition for desirable fishing sites, especially along the east side of the Homer Spit. Similar to 1995 but unlike previous years, however, compliance with the regulations along this hotly contested fishing area was exceptionally good, with only three violations and accompanying citations reported for fishing in closed waters, while several verbal warnings issued by ADF&G personnel resulted in expedient voluntary compliance.

The major factor which led to the short duration of the fishery was the strength of the return. Because coho assessment is limited in Lower Cook Inlet, sport and commercial catches are normally utilized as indicators of run strength. Unfortunately, commercial catches in Lower Cook Inlet once again did not accurately reflect the strength of the 1996 coho return due to a lack of directed effort. Informal observations in the local sport fisheries, however, suggested

very strong returns. This information, along with catch rates from the first 48 hours of fishing as well as previous experience managing this fishery, led the staff to project that a harvest within the guideline range would be achieved by the end of the second (48-hour) fishing period. Even though coho returns were strong, without the contribution of enhanced fish to the catches, the personal use fishery would undoubtedly have been more prolonged and therefore similar to historical fisheries prior to enhancement. Based on postseason analysis of fishery performance during the personal use fishery, the 1996 coho run was considered above average in strength.

One interesting statistic regarding the 1996 fishery involved the chinook salmon catch. The 1996 harvest of 301 fish represents the highest catch ever recorded for this species and was two and one-half times the previous record of 118 fish taken in 1995 (Appendix Table 26). The primary reason for the increased chinook harvest was due to greater numbers of adult fish returning to the "enhancement lagoon", or Fishing Hole, on the Homer Spit as a result of a new "late run" project. Begun in recent years, this project specifically utilized brood stock which demonstrated late run-timing characteristics in an effort to expand and prolong sport fishing opportunities for chinooks on the Spit. The late run timing of returning adults overlapped the personal use fishery and, consequently, resulted in increased gillnet catches of chinook salmon, particularly along the Homer Spit.

The 1996 fishery once again verified the extreme popularity of the east side of the Homer Spit as the most sought after fishing area, undeniably due to the coho enhancement project at the Homer Spit "fishing lagoon". Prior to enhancement, the Spit was considered only average in terms of harvest productivity. The Spit's easy road access and the enhanced coho return have combined to encourage fishermen to clamor for fishing sites, a situation which resulted in numerous violations during previous gillnet fisheries, but in 1995 and again in 1996 the Spit was surprisingly "quiet". Perhaps the convictions of several violators during the 1994 fishery, combined with pre-fishery cautionary warnings contained in summary handouts, sufficiently deterred similar violations during the last two seasons.

One aerial survey of Clearwater Slough, the major coho index stream at the head of Kachemak Bay, was conducted in early September to gauge escapements. An estimate of 820 cohos generated during that survey is considered quite good based on historical indices and reinforced the staff's assessment of a strong coho return.

The fishery in 1997 is expected to be somewhat different from recent years' fisheries. For the first time since 1985, there will be little or no contribution of coho salmon from a traditional enhancement project at Caribou Lake, near the head of Kachemak Bay, due to a suspension of the stocking program after 1995. This could significantly lengthen the duration of the fishery since these contributions have played an important role in the personal use harvests over the last decade. More importantly, if the fishery lasts longer, the fishing mortality on natural stocks originating from the head of Kachemak Bay will likely be greater, which could in turn impact escapement levels for these natural stocks. Fishing effort and participation is expected to be similar to recent years but could be affected by other alternative fisheries elsewhere in Cook Inlet. Although limited as an inseason management tool, voluntary catch reports will once again be employed to help determine an appropriate closure time for the 1997 fishery. Based on experience gained during the past seven years' fisheries, it should be possible to keep the coho harvest within the guideline range.

NANWALEK/PORT GRAHAM SUBSISTENCE FISHERY

One of two subsistence fisheries in LCI during 1996 occurred near the villages of Nanwalek (formerly English Bay) and Port Graham, located approximately 21 nautical miles southwest of Homer on the south side of Kachemak Bay (Figure 2). Most fishing normally occurs within close proximity to the respective villages and targets sockeye salmon returning to the English Bay Lakes system. Some additional fishing also occurs in Koyuktolik ("Dogfish") Bay, located about seven nautical miles south of English Bay, targeting non-local stocks of chinook salmon as well as local stocks of chum salmon.

The sockeye salmon run to English Bay Lakes has been severely depressed for much of the last decade, with returns failing to achieve the minimum escapement goal for nine consecutive years between 1985 and 1993. More recent returns have been bolstered as a result of a rehabilitation project initiated by ADF&G and subsequently taken over by the Chugach Regional Resources Commission (CRRC) on behalf of the village of Nanwalek. Because the return in 1996 was projected to produce harvestable surpluses, the commercial, subsistence, and sport fisheries were all allowed to remain open in order to target on this return, while an enumeration weir operated by CRRC monitored escapement inseason. Although a closure was imposed on the commercial set gillnet fishery during mid-June due to concern for the sockeye escapement rate into English Bay Lakes, the subsistence fishery was allowed to remain open on the regular schedule of two 48-hour periods per week for the entire season as the staff felt that this would allow opportunity for Port Graham and Nanwalek village residents to meet their sockeye salmon subsistence needs without unduly jeopardizing escapement into the lakes.

The strategy appeared to succeed, as village representatives indicated that sufficient numbers of sockeyes were being taken for subsistence purposes, while the escapement appeared to be adequate. Another closure on the commercial set gillnet fishery occurred in mid-July in a final effort to achieve the desired sockeye escapement goal, and the Port Graham Section was closed to commercial set gillnetting in early August to protect a weak natural return of pinks to Port Graham River, but the subsistence fishery in the entire Port Graham Subdistrict remained open on a schedule of two 48-hour periods per week for the remainder of the season.

The continuation of regular 48-hour subsistence openings in the Port Graham and English Bay areas resulted in above average catches of sockeye salmon at Nanwalek (Appendix Table 29), amounting to the second highest total since 1984. Catches of chinook salmon were up as well, while the coho and chum harvests were about average and the pink catch below average. At Port Graham, sockeye catches were the highest since 1984 and well above the historical average (Appendix Table 28). Chinook catches, which were down from last season but still above average, appeared to provide a substantial percentage of that village's subsistence needs.

Coho and pink catches at Port Graham were below the historical average, while chum harvests were above average for the sixth straight year.

SELDOVIA AREA SUBSISTENCE SALMON GILLNET FISHERY

A set gillnet fishery in the waters near Seldovia (Figure 2) on the south side of Kachemak Bay in 1996 was LCI's newest subsistence salmon fishery. Established by the Alaska Board of Fisheries at their most recent LCI meeting in the fall of 1995, the fishery was designed to primarily target non-local stocks of chinook salmon as they transited these waters. In considering seasons and bag limits, the Board carefully restricted the fishery to reduce possible interception of enhanced chinook salmon bound for a popular stocking site in the Seldovia small boat harbor since these enhanced fish were intended to principally benefit sport fishermen.

Regulations in the fishery included a "split" season, the first occurring from April 1 through May 20 and the second occurring during the first two weeks of August. A guideline harvest limit of 200 chinook salmon was established for the early season, while the annual possession limit was set at 20 chinooks per household. During the April/May season, fishing was allowed during two 48-hour periods each week, while in August the fishery was only open on the first two weekends of the month. Waters open to fishing essentially amounted to those along the eastern shore of Seldovia Bay as well as a short stretch of water outside of Seldovia Bay proper just west of Point Naskowhak (also called the "outside beach"). Gear was limited to set gillnets not exceeding 35 fathoms in length, 45 meshes in depth, and six inches (stretched) mesh size, identical to gear regulations governing the nearby Port Graham/English Bay subsistence fishery. A permit issued by the Department was required prior to fishing, and catches were to be recorded on the permit and also voluntarily reported to the Department's Homer office in season so that cumulative harvest totals could be monitored.

A total of 42 permits was issued for the early season, while four permits were issued for the August season. Inseason call-ins were almost totally absent during both seasons, but several non-participants called the Homer office and indicated that excessive under-reporting of chinook salmon catches was occurring in the early season fishery. These reports proved to be unfounded, however, as a Department representative on the grounds near the end of the season was able to confirm actual catches. At the close of each season, nearly all permits were returned to the Department as required by regulation, and catches were determined from records on each permit. For the early season, only 13 of 41 permit holders (31%) actively fished, with a resulting catch of 51 chinook salmon and seven sockeyes. In the late season, only one of three permit holders (33%) actively fished, reporting a catch of exactly one sockeye.

The fishery in 1997 is expected to be similar to the inaugural season, with only limited participation and harvest expected. Because the fishery is new, it may take some time for fishermen to learn the most productive fishing sites and successful techniques, thus the harvests are not expected to approach the guideline harvest limit during the first few seasons. The staff was directed by the Board of Fisheries to report on the status of the Seldovia subsistence fishery during the next cycle for LCI, which is scheduled for late 1998.

COMMERCIAL HERRING FISHERY

INTRODUCTION

Similar to salmon, the LCI herring management area is divided into five separate fishing districts, with commercial herring fishing historically occurring in all but the Barren Islands District (Figure 1). Herring fishing began in the Southern District in 1914 as a gillnet fishery within Kachemak Bay. Eight saltries, six near Halibut Cove, were operating during the peak of the fishery. Fishing with purse seines began in 1923, and after three subsequent years of

average annual harvests approaching 8,000 short tons (st), herring populations, along with the fishery, collapsed.

The next LCI herring fishery began in 1939 and was centered in the Resurrection Bay and Day Harbor area of the Eastern District. This was a purse seine fishery with the product used exclusively for oil and meal reduction. Peak harvests occurred from 1944 through 1946, averaging 16,000 st each year, and stocks sharply declined thereafter, apparently due to overexploitation.

Japanese markets for a salted herring roe product resulted in development of a sac roe fishery in the 1960's. Market demand and the relatively high prices paid to fishermen caused rapid expansion of the fishing fleet and harvest. Although Department management and research efforts lagged behind the rapid growth of the fishery, conservative management strategies and guideline harvest levels were established in response to historical overexploitation of the herring fisheries statewide.

1996 SEASON SUMMARY

A total of 2,984 st of Pacific herring was landed in the Kamishak Bay District during 1996 (Tables 10 and 11). The herring sac roe harvest was about 10% less than the 1995 harvest of 3,378 st but was nearly equal to the average harvest since 1986 (Appendix Table 31). Estimated exvessel value of the 1996 harvest was \$6.0 million (Appendix Table 32).

Of the 74 LCI herring permits issued, 62 permit holders made deliveries in 1996 (Table 10). A total of 11 processors/buyers registered to buy herring in LCI, with all actually taking fish this season. Roe recoveries reported on fish tickets averaged 10.1% for the sac roe harvest (Appendix Table 32).

Due to consistently poor weather and water clarity conditions, aerial surveys rarely provide consistent reliable estimates of total biomass returning to Kamishak District Bay waters. As a result, an age-structured-analysis (ASA) model has been used for the past four years to forecast herring abundance for Kamishak Bay, as well as to "hindcast" previous years' total abundance. This model incorporates a variety of heterogeneous data sources including: times series of commercial catch age composition; total run age composition; and aerial survey biomass estimates from years with adequate survey conditions and coverage. The model simultaneously minimizes the differences between expected and observed return data for each of its components, updates hindcasts of previous years' abundance, and returns a forecasted estimate of the following year's return. The ASA model estimated the total 1996 return at 27,640 st (Appendix Table 34), about 7,000 tons higher than the preseason forecast but a decrease from the 32,100 st estimated for 1995. In the commercial fishery, the exceptionally strong 1988 cohort continued to dominate samples as age-8 fish (Table 11), as expected, while younger age classes (ages-4 through -6) were stronger than anticipated and older classes (ages-9 through -13+) were slightly weaker.

No sac roe herring fishery occurred in the Southern District in 1996 as fish were never present in sufficient numbers to allow a harvest. The Outer and Eastern Districts also were not opened to purse seining in 1996, primarily due to the lack of interest by processors and fishermen in these areas. The historical predominance of young (age-3 and age-4) fish, roe recoveries historically below 10%, and the exploratory nature of the fishery, have discouraged effort in these two districts.

ASSESSMENT METHODS

Aerial surveys were conducted throughout the herring spawning season to determine relative abundance and distribution of herring in the Kamishak Bay and Southern Districts. Data collection methods were consistent with those used the previous six seasons. Numbers and distribution of herring schools, location and extent of milt, and visibility factors affecting survey

results were recorded on index maps for each survey. Standard conversion factors of 1.52 st (water depths of 16 ft or less), 2.56 st (water depths between 16 and 26 ft), and 2.83 st (water depths greater than 26 ft) per 538 square feet were used to convert estimated herring school surface areas to biomass.

Survey conditions in the Kamishak Bay District were generally only fair throughout the season, meaning nearly all surveys were hampered to some extent by high winds which created substantial water turbidity and thus hindered aerial observation. An exception occurred during a single survey on May 13 when conditions were considered excellent. A total of 15 surveys were completed in the Kamishak Bay District, most of which were conducted in late April and early May. Only three surveys were completed from May 6 through the end of the month in the Kamishak Bay District. Six surveys were completed in the Southern District, while no comprehensive surveys of the Outer and Eastern Districts were conducted this season.

In the Kamishak Bay District, commercial landings were sampled to determine age, size, and sexual maturity of herring. In addition, test fishing by volunteer purse seine vessels was conducted to collect samples for roe recovery analysis prior to the fishery. This test fishing data was incorporated into postseason analysis to help interpret aerial survey biomass data. For the first time in many years, post-fishery herring samples were also collected throughout the district during the month of May to further aid in understanding the dynamics of the Kamishak Bay herring stocks. A commercial purse seine vessel was chartered during the month of May to collect herring samples from Kamishak Bay waters. For five days beginning on May 14, the vessel made a cumulative total of five sets near Fortification Bluff, in Iniskin Bay, off Oil Bay, and near Amakededulia Cove, resulting in the collection of just over 2,000 fish for AWL samples. Additional surveillance was conducted with the aid of hydroacoustic gear in waters of Cottonwood Bay, Ursus Cove, Douglas Reef, and Silver Beach. Analysis of the samples confirmed significantly higher percentages of younger age fish, particularly ages-3 and -4, compared to those collected around the time of the commercial fishery in late April. The additional information gathered during these postseason sampling efforts provided evidence of

age-class data that has not been corroborated for many years and was useful in generating the 1997 herring forecast.

SPAWNING POPULATIONS

Kamishak Bay District

During the 1996 season aerial surveys to estimate biomass in the Kamishak Bay District were conducted from April 15 through May 28, with herring first observed April 24 in Bruin Bay, near Chenik Head and Nordyke Island, and at Douglas Reef. The highest daily biomass observation was made on April 26 with an estimate of 1,437 st. As was the case during the past four seasons, and unlike prior years, there was no distinct separation in age composition between those fish appearing on the grounds initially and those following over the next one to two weeks. Normally the early fish tend to be larger and older, and a steady influx of younger age fish typically occurs as the return progresses. Test fish samples in 1996 documented a relatively high percentage of age-8 fish early in the return, with the percentage remaining fairly steady from the time of initial sampling up through the commercial fishery. However, an increase in younger age fish became readily apparent in the May (post-fishery) samples as percentages of ages-3 through -7 were considerably higher than those collected around the time of the commercial fishery in late April.

As stated previously, the 1996 run was estimated at 27,600 st (Table 11, Appendix Table 34) using the ASA model because aerial surveys were hindered by inclement weather throughout the season. Postseason data analysis from pre- and post-fishery test fishing sources as well as commercial harvests showed that the strong 1988 year class of herring observed in the last three fisheries dominated the 1996 run at 44% of the total biomass by weight (Table 11), followed by age-4 fish (12%) and age-6 fish (9%). Over one-fourth of the return was composed of fish younger than age 6 while only about 5% was older than age 10 (Figure 16, Table 11). It must be emphasized that these figures represent the overall biomass spanning the time period between

mid-April and the end of May, since samples were obtained at the time of the fishery as well as during the month of May. In most recent years, age composition samples were limited to the time period surrounding the commercial fishery in late April, thus making overall age composition estimation more difficult. The late season sampling efforts confirmed the influx of younger fish, as was observed in earlier years.

Despite individual aerial surveys recording relatively sparse tonnages, the amount of active spawning documented in 1996 was considered comparatively good. A total of seven sightings occurred during surveillance flights, cumulatively totaling over 11 linear miles of spawn. The heaviest spawning was seen immediately after the commercial fishery on April 24, with 7.0 miles documented, primarily inside Amakdedulia Cove with a lesser amount in Bruin Bay and near Contact Point.

Southern District

Six aerial surveys of the Southern District were flown between April 30 and May 29, nearly all conducted under excellent conditions. The 1996 run biomass, estimated as the sum of all daily biomass estimates, was 3,659 st, almost identical to that of 1995. The majority of herring were observed in Mallard Bay, with the peak individual biomass survey (1,189 st) occurring on a May 14 survey. Peak surveys in areas where herring historically have been observed were as follows: Bear Cove, 192 st on May 14; Glacier Spit, 2 st on May 29; Mallard Bay, 1,140 st on May 15; and 57 st east of the Homer Spit/Mud Bay on May 8.

Once again this season, limited sampling of Southern District herring stocks was conducted on an opportunistic basis. A commercial vessel was chartered for one day on May 15 and was directed to fish in the vicinity of Mallard Bay based on earlier aerial observations. Two sets were made, cumulatively totaling just over 600 individuals, with preliminary analysis showing primarily younger age fish between ages-3 and -7. Highest percentages were seen in ages-5 and -6 year classes, with each component making up approximately one-fourth of the sample in numbers of fish. Overall average weight was 153 grams.

Outer and Eastern Districts

No aerial surveys of the Outer and Eastern Districts were flown during the 1996 season. The size of the area and the characteristically poor weather in the Gulf of Alaska, which precludes surveys on a regular basis, makes aerial biomass estimation in these districts impractical. However, incidental observations of herring in June during the early part of the salmon season confirmed the presence of herring in these two districts again this season.

COMMERCIAL FISHERY

Kamishak Bay District

Spotter pilots and fishermen first located and fished the Kamishak Bay District herring populations in 1973, but after several years of commercial harvests in the late 1970's herring abundance severely declined and the district was completely closed beginning in 1980. Herring stocks appeared to quickly rebound in response to the closure, and the fishery was reopened in 1985. Since then, the fishery has been regulated to achieve a 10% to 20% exploitation rate mandated by the Alaska Board of Fisheries.

By 1989, fishing efficiency had evolved to a level where intensive regulatory management was required to ensure maximum value of the harvest and maintain the guideline harvest level while protecting younger age fish. Management strategy during the last seven years in the Kamishak Bay District has stabilized the harvest at an average of just over 2,500 tons, or about 40% of the record high catch of 6,132 st set in 1987 (Appendix Tables 31 and 32).

Preseason management strategy in 1996 called for a guideline harvest level of 2,250 st (after subtracting a 250 st allocation for the Shelikof Strait food and bait fishery) based on a 12% exploitation of the forecasted biomass. The harvest rate as determined by the Kamishak Bay Herring Management Plan normally would have been set at the maximum of 15% of the

projected biomass. Due to concerns over the low abundance of recruit-age herring (ages-3 and -4) during 1994 and 1995, and continued declines in the aerially-derived estimates of biomass since 1993 (Appendix Table 34), a more conservative exploitation rate of 12% was chosen to set the guideline harvest level for the 1996 season. Although management prior to 1990 allowed the fishery to open on a specific calendar date, since that time industry technicians have been asked to evaluate test fish samples for roe recovery prior to commercial harvests to help maximize product quality and value.

Management staff traveled to Kamishak Bay aboard the state's *R/V PANDALUS* on Wednesday, April 17, reaching the grounds in late afternoon. An aerial survey was also conducted that day but no fish were sighted. Water temperatures were well above normal at 3.3 degrees C., and climatological conditions seemed accelerated with very little snow along the coastline and only isolated shore ice. The fleet was put on 12-hour notice effective at 6:30 p.m. Wednesday, April 17, to allow the Department to act quickly once fish were located. An aerial survey the next day was hindered by water turbidity, but two test sets were made by two different vessels near Nordyke Island. Analysis revealed age-8 fish dominating the samples, followed by age-7, age-6, and age-9 fish. Females in the sample were considered ripe with roe recoveries ranging from 10.5% to 11.3%. The staff wished to continue test fishing, but poor weather over the next four days, including winds reported at 55 knots in the southern portion of the district, precluded both aerial surveillance and test fishing.

Despite the lack of survey information and test fish data, the advance notice period was reduced to two hours effective at 12:00 noon on April 21. Although the staff acknowledged that an opening was unlikely at that time, the relative maturity of the fish in the first samples as well as the warm water temperatures suggested that flexibility would be required to react to new developments. Weather conditions on Tuesday, April 23, finally allowed a resumption of aerial surveys and test fishing, but once again no observations of fish were made from the air as water turbidity was high. Hydroacoustic observations, on the other hand, indicated that the biomass was building. Test fishing occurred throughout the day, with sets made between McNeil Cove

and Chenik Lagoon by eight different vessels over the course of the day. On-grounds analysis revealed relatively high male percentages (averaging 57%) with a significant percentage of immature females (4%). Additionally, roe recoveries varied widely, ranging from 3.0% to 12.8% (average 9.1%), with a similarly wide range in immature roe (0% to 5.5%). The data suggested that these fish probably represented the “front end” of the return, and in an effort to improve product quality the staff advised the fleet to stand down until the next morning, April 24. The advance notice period was concurrently reduced to one hour effective at 12:00 noon April 24.

Test fishing resumed on the morning of April 24, with samples showing the anticipated improvement in sex ratios and roe maturity. The morning’s aerial survey indicated fish generally distributed from two miles south of Nordyke Island up through Chenik Reef, and extending into Bruin Bay, with spawning occurring off the northern tip of Amakdedulia Cove. At noon, the fleet was advised that an opening was being considered for that afternoon in Management Areas 5 and 6 (Figure 8) pending final results and evaluation of the morning’s assessment activities. Roe maturity from the morning sets averaged 10.3% while the average weight was 238 grams (g). Age analysis showed close similarity to the preseason forecast for all but one sample, with age-8 fish comprising nearly half of the fish in the samples.

It was assumed that further delay of the fishery could result in reduced roe recoveries due to the influx of younger (immature) fish and/or an increase in the number of spawnouts. Because the management strategy attempts to minimize the harvest of younger age fish, and given the favorable weather conditions at the time, at 2:00 p.m. a 30-minute opening was announced for Management Areas 5 and 6, commencing by field announcement some time between 2:55 p.m. and 3:05 p.m. April 24. A field announcement on single sideband and VHF radios was chosen to minimize the possibility of early sets.

As the opening began, the majority of the fleet converged into a small area northeast of Chenik Lagoon where the bulk of the fishing took place. Seven additional boats were located in close proximity to Contact Point, while another nine focused their effort around Juma Reef due north

of Nordyke Island. Approximately 30 aircraft were present during the opening. Weather and water conditions were favorable for aerial observation and much of the seining was done with the aid of spotter airplanes.

Three hours after the opening, preliminary catch reports hailed in by processors totaled approximately 2,300 st, exceeding the preseason guideline harvest level and effectively closing the Kamishak Bay District for the remainder of the season. Post-fishery compilation of fish ticket information showed a total harvest of 2,984 st of herring harvested by 62 different permit holders (Table 10, Appendix Table 32). Age-weight-length analysis from the commercial harvest showed samples dominated by ages-8, -6 and -4 fish (47%, 10%, and 9%, respectively), followed in descending proportional order by ages-7, -5, and -9 fish (Table 11). The estimated exvessel value of the 1996 catch was \$5.97 million (Appendix Table 32) based on a sac roe estimated average price near \$2,000 per ton. Most companies paid an "on-grounds" base price with additional postseason settlements paid after price finalization with the foreign market.

A single Department of Public Safety, Division of Fish and Wildlife Protection (FWP) enforcement vessel, the *P/V TROOPER*, was stationed on the grounds for the 1996 herring fishery. One FWP officer from the Homer detachment, as well as two stationed aboard the *P/V TROOPER*, actively monitored the fishery, with no major violations documented and only a few minor infractions, such as lack of crewmember licenses, noted. No doubt the conspicuous enforcement efforts of FWP during recent seasons in the Kamishak Bay herring fishery has discouraged blatant disregard for the regulations.

By Alaska Board of Fisheries directive, the Kamishak Bay District herring fishery is managed with the intent of harvesting 10% to 20% of the available biomass. Although the harvest slightly surpassed the preseason guideline, the overall exploitation in 1996 was approximately 11% of the estimated total biomass, based on a total catch of 2,984 st and an escapement biomass of 24,656 st (Table 11, Appendix Table 34).

Southern District

Management strategy for the Southern District sac roe fishery was changed in 1989 to allow for a limited harvest of 150 to 200 st for the purposes of obtaining age, weight, length and roe recovery information. Sac roe herring had not been fished in the Southern District since 1979 when poor stock conditions forced an area-wide closure. Only one other fishery has occurred since that time, when 171 st of herring averaging 8.9% roe recovery were harvested by 10 vessels in a single 2.5-hour opening in Mallard Bay during 1989 (Appendix Table 31).

After the completion of the Kamishak Bay herring fishery, management attention was directed toward the Southern District on April 30 when the first aerial survey was flown. Surveys continued until the end of May, but a commercial harvest of sac roe herring was once again not allowed in the Southern District in 1996 because abundance estimates failed to document sufficient quantities of herring to warrant an opening.

Outer and Eastern Districts

During the early years of sac roe herring fishing in LCI, seining within the Outer and Eastern Districts primarily occurred in Resurrection Bay. Following a period of suspected over-exploitation, herring stocks throughout LCI generally declined after 1973. Concern over this decline prompted the Alaska Board of Fish and Game in 1974 to establish a 4,000 st quota for all of Lower Cook Inlet, with the Outer and Eastern Districts each allocated 1,000 st. The quotas were never utilized since stock abundance continued to decline, and the Outer and Eastern Districts were closed to fishing from 1975 through 1984.

In 1985, the sac roe fishery was allowed to resume in the Outer and Eastern Districts on a very conservative basis, even though no noticeable change in spawning biomass had been observed. Because of reduced stock abundance and extreme vulnerability to fishing, guideline harvest levels were set at 150 to 200 st for each of the four fishing areas created within these two districts.

Fishing effort in 1985 was minimal and the majority of the harvest (216 st; Appendix Table 31) once again occurred in Resurrection Bay.

Only limited and sporadic harvests have occurred in these two districts since 1985, with the majority of both the herring harvest and the observed biomass during the past seven years comprised of age-3 and age-4 fish. Unlike the Southern and Kamishak Bay Districts, samples from the Outer and Eastern Districts have contained up to 14% age-2 (sexually immature) herring. Although sampling has been very limited in recent years, no discernible shift to older age herring has ever been observed, suggesting the possibility that the Outer and Eastern Districts may be feeding and rearing grounds for juvenile fish of Prince William Sound origin.

Despite significant opportunity for exploratory fishing on a daily basis in the Outer and Eastern Districts during 1991 and 1992, the predominance of juvenile herring in the population and the history of marginally acceptable roe recoveries from fish caught in these areas has contributed to a lack of interest by fishermen and processors. These conditions were again prevalent during the years 1993 through 1996 and, consequently, the Outer and Eastern Districts were not opened to purse seining in any of the past four seasons.

HERRING OUTLOOK AND MANAGEMENT STRATEGY FOR 1997

Kamishak Bay District

The 1997 total biomass of herring in Kamishak Bay District is projected to be 25,300 st, approximately 8.5% less than the 1996 estimated return (Figure 15, Table 11). The 1997 forecast was generated from an age-structured-analysis (ASA) model similar to that used for Kamishak Bay during the last three years and also for Sitka Sound, Prince William Sound, and Togiak. The model projects a slight decrease in Kamishak herring abundance. Nearly 40% of the 1997 projected biomass (by weight) will be comprised of age-9 fish from the strong 1988 year class (Figure 16), which should equate to a mean weight of 227 grams per fish. Relatively

strong early recruit age classes (age-3 and -4 fish) collected during the post-season sampling in May of 1996 are also expected to contribute to 1997's return.

The Kamishak Bay District Herring Management Plan (regulation **5 AAC 27.465.**) dictates that a maximum 15% exploitation rate be utilized to set the 1997 guideline harvest level since the projected biomass falls between 20,000 and 30,000 st. Based on the projected return of 25,300 st, a surplus of approximately 3,420 st would be available for harvest at the 15% exploitation rate. In addition to the spring sac roe fishery in Lower Cook Inlet, a fall food and bait fishery on Kamishak Bay herring stocks occurs in the Shelikof Strait area of the Kodiak Management Area. By regulation the Shelikof fishery is allocated 10% of the total allowable harvest for Kamishak Bay herring stocks, which equates to a maximum potential allocation of 2% of the total forecasted Kamishak Bay herring biomass. Harvest allocation in 1997, in accordance with the Kamishak Bay Herring Management Plan, will be as follows:

		Tons
KAMISHAK BAY SAC ROE HARVEST	(13.5%)	3,420
SHELIKOF STRAIT FOOD & BAIT	(1.5%)	380
TOTAL ALLOWABLE HARVEST	(15.0%)	3,800

Although the 1997 herring biomass forecast for the Kamishak Bay District is approximately 8.5% less than the 1996 estimated return (Table 11, Figure 15), the guideline harvest level for 1997 is over 50% greater than the 1996 guideline. This apparent contradiction in part resulted from differences between preseason and postseason biomass estimates. Figure 15 is based on the ASA model's hindcasts of previous years' biomasses. As the time series of age composition data for the Kamishak herring stock expands with each new year's sampling, the model estimates biomasses for previous years more accurately than it was able to forecast them into the future.

Thus, the best available information suggests that the model underestimated the available biomass for 1996, with a preseason forecast of 20,925 st and a postseason estimate of 27,640 st.

A second factor in the increased guideline for 1997 relates to the Kamishak Bay District Herring Management Plan (5 AAC 27.465). Under this plan, a maximum exploitation rate of 15% is allowed for a spawning biomass projection between 20,000 and 30,000 st. Because of model uncertainty and the fact that the 1996 forecasted biomass was only marginally greater than the 20,000 st threshold, a conservative 12.5% exploitation rate was applied for management purposes. The 1997 model implies that the 1996 forecast underestimated true biomass. In addition, the 1997 forecast is well above the threshold for a 15% exploitation rate. Therefore, the 1997 guideline harvest level was increased despite an apparent decline in biomass from 1996.

As in recent years, a very conservative approach will be taken with regard to any harvest of young, newly recruited herring since these fish will provide future spawning stock and contribute to future harvests. No fishery on young (ages-3 and -4) fish will be considered this season. Unless data becomes available indicating that significant recruitment has occurred, or that an unusually large biomass has moved into the district, the Kamishak Bay sac roe harvest will not be allowed to exceed 3,420 tons.

Other Districts

Based on recent trends in herring abundance and age structure in the Southern, Outer, and Eastern Districts of LCI, no commercial herring harvests are anticipated in these areas during 1997. Sufficient quantities of herring in the Southern District must be documented before a commercial opening is considered. Monitoring of the Southern District herring stocks will occur as in the past through the use of aerial surveys in conjunction with test fishing samples collected on an opportunistic basis. The Outer and Eastern Districts will only be allowed to open if adequate evidence becomes available suggesting commercial quantities of adult herring are

present. Any potential fishery in these districts will be considered "exploratory" in nature and will be managed accordingly.

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Table 1. Commercial, hatchery, and derby salmon catches in numbers of fish by species, district, and gear type, Lower Cook Inlet, 1996.

District						
Gear Type	Chinook	Sockeye	Coho	Pink	Chum	Total
Southern						
Commercial:						
Set gillnet	1,054	69,338	5,779	14,813	2,792	93,776
Purse seine	126	268,782	3,762	10,260	719	283,649
Hatchery:						
Purse seine	0	14,309	2	419,163	0	433,474
Weir	<u>0</u>	<u>5,734</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5,734</u>
Total	1,180	358,163	9,543	444,236	3,511	816,633
Outer						
Commercial:						
Purse seine	0	14,999	96	7,199	3	22,297
Eastern						
Commercial:						
Purse seine	0	36,981	1	35	223	37,240
Derby ^a :						
Hook & Line	0	0	2,600	0	0	2,600
Hatchery:						
Weir	<u>0</u>	<u>7,938</u>	<u>1,331</u>	<u>0</u>	<u>0</u>	<u>9,269</u>
Total	0	44,919	3,932	35	223	49,109
Kamishak						
Commercial:						
Purse seine	0	18,093	0	19	1	18,133
Hatchery:						
Purse seine	<u>1</u>	<u>13,511</u>	<u>1</u>	<u>17</u>	<u>26</u>	<u>13,556</u>
Total	1	31,604	1	36	27	31,669
LCI Total	1,181	449,685	13,572	451,506	3,764	919,708
Percent	0.13	48.89	1.48	49.09	0.41	100.00
1976-95						
Average	1,250	185,302	13,390	1,161,777	103,183	1,464,901

^a Derby catches are fish entered into the Seward Silver Salmon Derby which are subsequently sold to a commercial processor, therefore these catches are considered part of the LCI "commercial harvest".

Table 2. Commercial chinook salmon catches, and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1996.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Halibut Cove	420		420
China Poot Bay	47		47
Neptune Bay	20		20
Tutka/Kasitsna Bays	281		281
Barabara Creek	64		64
Seldovia Bay	322		322
Port Graham	20		20
English Bay	6		6
SOUTHERN DISTRICT TOTAL	1,180		1,180
OUTER DISTRICT TOTAL	0		0
EASTERN DISTRICT TOTAL	0		0
KAMISHAK BAY DISTRICT			
Kirschner Lake			
Hatchery Cost Recovery	1 ^b		1
KAMISHAK BAY DISTRICT TOTAL	1		1
TOTAL LOWER COOK INLET	1,181		1,181

^a Chinook escapement in Lower Cook Inlet is very limited; no escapement surveys are conducted.

^b Figure represents chinook salmon taken incidentally during hatchery sockeye salmon cost recovery efforts.

Table 3. Commercial sockeye salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1996.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Humpy Creek		9	9
Halibut Cove	75,300		75,300
China Poot Bay			
Common Property Fishery	110,445		
Hatchery Cost Recovery	12,064		
China Poot Creek		441 ^b	
Total Run			122,950
Neptune Bay			
Common Property Fishery	100,500		
Hatchery Cost Recovery	2,171		
Total Run			102,671
Tutka/Kasitsna Bays & Tutka Creek	20,300 ^c	1	20,301
Barabara Creek	7,539		7,539
Seldovia Bay	11,926		11,926
Port Graham Bay/River	5,203	8	5,211
English Bay			
Common Property Fishery	6,981		
Hatchery Cost Recovery	5,734		
English Bay Lakes		12,380 ^d	
Total Run			25,095
SOUTHERN DISTRICT TOTAL	358,163	12,839	371,002
OUTER DISTRICT			
Dogfish Bay		2	2
Port Chatham		4	4
Windy Bay/Windy Right Creek		1	1
Nuka Island/S. Nuka Island Creek		1	1
East Arm Nuka Bay (McCarty Fiord)	14,999		
Delight Lake		7,700	
Desire Lake		9,400	
Delusion Lake		720	
Total Run			32,819
OUTER DISTRICT TOTAL	14,999	17,828	32,827

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Table 3. (page 2 of 2)

Subdistrict/System	Catch	Escapement ^a	Total Run
EASTERN DISTRICT			
Aialik Bay/Aialik Lake	1,037	3,500	4,537
Resurrection Bay North			
Common Property Fishery	35,944		
Hatchery Cost Recovery	7,938		
Bear Lake		8,004 ^d	
Salmon Creek		821	
Grouse Creek		800	
Clear Creek		4	
Total Run			<u>53,511</u>
EASTERN DISTRICT TOTAL	44,919	13,129	58,048
KAMISHAK BAY DISTRICT			
Ursus Cove			
Brown's Peak Creek		6	
Ursus Cove Lagoon Creek		900	
Total Run			906
Kirschner Lake			
Common Property Fishery	18,093		
Hatchery Cost Recovery	13,511		
Total Run			31,604
Bruin Bay			
Bruin Lake Creek		650 ^b	
Bruin River		200	
Total Run			850
Chenik Lake			
Amakdedori Creek		2,930	
Chenik Creek/Lake		2,990 ^d	
Total Run			5,920
Paint River		200 ^c	200
McNeil Cove (Mikfik Creek/Lake)		10,500	10,500
Kamishak/Douglas Reef			
Little Kamishak River		200	
Big Kamishak River		1,590	
Douglas Reef Creek		600	
Total Run			<u>2,390</u>
KAMISHAK BAY DISTRICT TOTAL	31,604	20,766	52,370
TOTAL LOWER COOK INLET	449,685	64,572	514,247

^a Escapement estimates derived from limited aerial surveys. Numbers represent unexpanded aerial live counts.

^b No freshwater escapement, prevented by barrier falls.

^c Figure includes 74 sockeyes taken during hatchery pink salmon cost recovery.

^d Weir counts.

^e No freshwater escapement, ladder not opened during 1996.

Table 4. Commercial coho salmon catches (including hatchery cost recovery and sport derby sold to commercial processors) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1996.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Northshore Subd./Clearwater Slough		820 ^b	820
Halibut Cove	1,423		1,423
China Poot Bay	952 ^c		952
Neptune Bay	1,848		1,848
Tutka/Kasitsna Bays	2,064		2,064
Barabara Creek	1,294		1,294
Seldovia Bay	319		319
Port Graham	90		90
English Bay	<u>1,553</u>		<u>1,553</u>
SOUTHERN DISTRICT TOTAL	9,543	820	10,363
OUTER DISTRICT			
East Arm Nuka Bay (McCarty Fiord)	96		96
OUTER DISTRICT TOTAL	96		96
EASTERN DISTRICT			
Aialik Bay	1		1
Resurrection Bay North			
Hatchery Cost Recovery	1,331		
Sport Derby	2,600 ^d		
Bear Lake (weir counts)		380	
Hatchery Brood Stock		608	
Total Run			<u>4,919</u>
EASTERN DISTRICT TOTAL	3,932	988	4,920
KAMISHAK BAY DISTRICT			
Kirschner Lake	<u>1^c</u>		<u>1</u>
KAMISHAK BAY DISTRICT TOTAL	1		1
TOTAL LOWER COOK INLET	13,572	1,808	15,380

^a Coho escapement in Lower Cook Inlet is very limited; only one escapement survey was conducted during 1996.

^b Only one escapement survey of Clearwater Slough was conducted during 1996.

^c Includes 2 (China Poot) and 1 (Kirschner) cohos taken during hatchery sockeye salmon cost recovery.

^d Seward Silver Salmon Derby catches, sold to a commercial processor and considered "commercial harvest".

Table 5. Commercial pink salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1996.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Humpy Creek		9,000	9,000
Halibut Cove	2,298		2,298
China Poot Bay/Creek	1,192 ^b	2,803	3,995
Neptune Bay	6,982 ^b		6,982
Tutka/Kasitsna Bays			
Common Property Fishery	6,941		
Hatchery Cost Recovery	419,160		
Hatchery Brood Stock		138,021	
Tutka Lagoon Creek		3,456	
Total Run			567,578
Barabara Creek	2,096	2,394	4,490
Seldovia Bay & River	4,088	17,757	21,845
Port Graham	821		
Hatchery Brood Stock		1,879	
Port Graham River		7,039	
Port Graham Left		450	
Total Run			10,189
English Bay	658		658
SOUTHERN DISTRICT TOTAL	444,236	182,799	627,035
OUTER DISTRICT			
Dogfish Bay		2,347	2,347
Port Chatham		8,598	8,598
Chugach Bay		8,251	8,251
Windy Bay			
Windy Right Creek		2,492	
Windy Left Creek		9,944	
Total Run			12,436
Rocky Bay/River		80,057	80,057
Port Dick			
Port Dick (head end) Creek		23,175	
Slide Creek		13,099	
Island Creek		40,070	
Total Run			76,344
Nuka Island/South Nuka Isl. Creek		6,776	6,776
East Arm Nuka Bay (McCarty Fiord)	7,199	^c	7,199
OUTER DISTRICT TOTAL	7,199	194,809	202,008

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Table 5. (page 2 of 2)

Subdistrict/System	Catch	Escapement ^a	Total Run
EASTERN DISTRICT			
Aialik Bay	19		19
Resurrection Bay North	16		
Bear/Salmon Creeks		7,963	
Clear Creek		633	
Sawmill Creek		199	
Spring Creek		144	
Tonsina Creek		449	
Thumb Cove		9,464	
Total Run			18,868
Renard Island/Humpy Cove		3,405	3,405
EASTERN DISTRICT TOTAL	35	22,257	22,292
KAMISHAK BAY DISTRICT			
Inisksin Bay			
North Head Creek		400	
Sugarloaf Creek		158	
Total Run			558
Ursus Cove			
Brown's Peak Creek		2,446	
Ursus Lagoon Creek		200	
Total Run			2,646
Rocky Cove/Sunday Creek		2,846	2,846
Kirschner Lake	36 ^d		36
Bruin Bay & River		27,562	27,562
Kamishak Bay/ Big Kamishak River		16,677	16,677
KAMISHAK BAY DISTRICT TOTAL	36	50,289	50,325
TOTAL LOWER COOK INLET	451,506	450,154	901,660

^a Escapement estimates are derived from periodic ground or aerial surveys with stream life factors applied.

^b China Poot and Neptune catches include 1 and 2 pinks (respectively) caught during hatchery sockeye salmon cost recovery.

^c Insufficient survey data to generate escapement estimate.

^d Kirschner Lake catches include 17 pinks caught during hatchery sockeye salmon cost recovery.

Table 6. Commercial chum salmon catches and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1996.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Humpy Creek		278	278
Halibut Cove	268		268
China Poot Bay	101		101
Neptune Bay	386		386
Tutka Bay/Tutka Lagoon Creek	961	20	981
Barabara Creek	486		486
Seldovia Bay & River	627	2,560	3,187
Port Graham & River	448	3,742	4,190
English Bay	<u>234</u>		<u>234</u>
SOUTHERN DISTRICT TOTAL	3,511	6,600	10,111
OUTER DISTRICT			
Dogfish Bay		6,699	6,699
Port Chatham		558	558
Windy Bay			
Windy Right Creek		296	
Windy Left Creek		121	
Total Run			417
Rocky Bay & River		1,966	1,966
Port Dick			
Port Dick (head end) Creek		2,254	
Slide Creek		1,932	
Middle Creek		1,332	
Island Creek		6,945	
Total Run			12,463
Nuka Island/Petrof River		32	32
East Arm Nuka Bay	<u>3</u>		<u>3</u>
OUTER DISTRICT TOTAL	3	22,135	22,138
EASTERN DISTRICT			
Aialik Bay	5		5
Resurrection Bay North	218		
Sawmill Creek		707	
Spring Creek		462	
Tonsina Creek		3,720	
Thumb Cove		139	
Clear Creek		88	
Total Run			5,334
Renard Island/Humpy Cove	<u>2</u>	<u>2</u>	<u>2</u>
EASTERN DISTRICT TOTAL	223	5,118	5,341

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Table 6. (page 2 of 2)

Subdistrict/System	Catch	Escapement ^a	Total Run
KAMISHAK BAY DISTRICT			
Inisksin Bay			
Iniskin River		7,840	
Sugarloaf Creek		467	
North Head Creek		880	
Total Run			9,187
Cottonwood Bay & Creek		16,089	16,089
Ursus Cove			
Brown's Peak Creek		978	
Ursus Lagoon Right Creek		5,018	
Ursus Cove Lagoon Creek		2,617	
Total Run			8,613
Rocky Cove/Sunday Creek		2,080	2,080
Kirschner Lake	27 ^b		27
Bruin Bay & River		14,933	14,933
McNeil River		16,096	16,096
Kamishak/Douglas Reef			
Little Kamishak River		4,378	
Big Kamishak River		11,118	
Douglas Reef Creek		424	
Total Run			15,920
Douglas River/Douglas Beach Creek		746	746
KAMISHAK BAY DISTRICT TOTAL	27	83,664	83,691
TOTAL LOWER COOK INLET	3,764	117,517	121,281

^a Escapement estimates are derived from periodic ground or aerial surveys with stream life factors applied.

^b Kirschner Lake catches include 26 chums taken during hatchery sockeye salmon cost recovery.

Table 7. Exvessel value^a of the commercial salmon catch in numbers of dollars by species, gear type, and harvest type, Lower Cook Inlet, 1996.

	Chinook	Sockeye	Coho	Pink	Chum	Total
COMMON PROPERTY - PURSE SEINE						
No. of Fish	126	338,855	3,859	17,513	946	361,299
Pounds	1,371	1,705,764	23,607	59,673	7,734	1,798,149
Price/lb.	\$0.76	\$0.90	\$0.29	\$0.05	\$0.15	
Value	\$1,042	\$1,535,188	\$6,846	\$2,984	\$1,160	\$1,547,220
COMMON PROPERTY - SET GILLNET						
No. of Fish	1,054	69,338	5779	14,813	2,792	93,776
Pounds	18,570	415,950	43,654	59,239	22,086	559,499
Price/lb.	\$1.37	\$1.00	\$0.40	\$0.06	\$0.19	
Value	\$25,441	\$415,950	\$17,462	\$3,554	\$4,196	\$466,603
HATCHERY - PURSE SEINE & WEIR						
No. of Fish	1	41,492	1,334	419,180	26	462,033
Pounds	14	195,309	10,761	1,165,860	153	1,372,097
Price/lb.	\$0.57	\$0.83	\$0.25	\$0.08	\$0.12	
Value	\$8	\$162,106	\$2,690	\$93,269	\$18	\$258,091
SPORT FISHING DERBY^b - HOOK & LINE						
No. of Fish			2,600			2,600
Pounds			25,593			25,593
Price/lb.			\$0.57			\$0.57
Value			\$14,588			\$14,588
TOTAL ALL GEARS						
No. of Fish	1,181	449,685	13,572	451,506	3,764	919,708
Pounds	19,555	2,317,023	103,615	1,284,772	29,973	3,754,938
Price/lb.	\$1.33	\$0.91	\$0.40	\$0.08	\$0.18	
Value	\$26,491	\$2,113,244	\$41,586	\$99,807	\$5,374	\$2,286,502

^a Exvessel value is calculated from average prices, which are determined only by fish ticket information and may not reflect retroactive or postseason adjustments.

^b Fish entered into the Seward Silver Salmon Derby are subsequently sold to a commercial processor and are therefore considered "commercial harvest".

Table 8. Emergency orders issued for the commercial, personal use, and subsistence salmon and herring fisheries in Lower Cook Inlet, 1996.

Number/ Issue Date	DESCRIPTION
2-F-H-001-96 April 24	Opens Management Areas 5 and 6 in the Kamishak Bay District to commercial herring sac roe seining for approximately one-half hour commencing by an ADF&G field announcement sometime between 2:55 p.m. and 3:05 p.m. Wednesday, April 24, 1996. The fishery will close at 3:30 p.m. Management Areas 5 and 6 include those waters south of 59° 23.13' N. latitude and west of 153° 37.0' W. longitude.
2-F-H-002-96 May 10	Opens those waters of Resurrection Bay in the Eastern District enclosed by a line from Aialik Cape south to a point one mile due south of Aialik Cape, then northeast to a point one mile due south of Cape Resurrection, then north to Cape Resurrection, to commercial salmon seining on a weekly schedule of five days per week, from Monday 6:00 a.m. until Friday 10:00 p.m., effective Monday, May 13, 1996, until further notice. All waters along the west shore of Resurrection Bay west of a line from the old military dock pilings north of Caines Head to the former Alaska state ferry dock will remain closed to seining.
2-F-H-003-96 May 29	Establishes two 48-hour weekly fishing periods in the Kamishak Bay District commercial salmon seine fishery, which opens by regulation on June 1, 1996. These periods shall be from Monday 6:00 a.m. until Wednesday 6:00 a.m. and from Thursday 6:00 a.m. until Saturday 6:00 a.m. In addition, this emergency order closes the Chenik and Paint River Subdistricts within the Kamishak Bay District to commercial salmon seining until further notice.
2-F-H-004-96 June 7	Extends weekly commercial salmon seine fishing time in the McNeil River Subdistrict of the Kamishak Bay District to five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., effective at 6:00 p.m. Monday, June 10, 1996, until further notice.
2-F-H-005-96 June 12	Extends weekly commercial salmon seine fishing time in the McNeil River Subdistrict of the Kamishak Bay District to seven days per week effective at 6:00 a.m. Saturday, June 15, 1996, until further notice.
2-F-H-006-96 June 14	Closes waters of Port Graham Subdistrict, including the English Bay Section, in the Southern District to commercial salmon set gillnet fishing, effective at 6:00 a.m. Monday, June 17, until further notice. The subsistence salmon set gillnet fishery in waters of the Port Graham Subdistrict will remain open.
2-F-H-007-96 June 20	Designates and establishes Special Harvest Areas (SHA) for the Cook Inlet Aquaculture Association (CIAA) in the Chenik, Paint River, Bruin Bay, and China Poot Subdistricts of the Lower Cook Inlet management area. This

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Table 8. (page 2 of 5)

Number/ Issue Date	DESCRIPTION
2-F-H-007-96 June 20 (cont'd)	<p>emergency order also closes the Kirschner and Bruin Lakes SHA's to the common property salmon seine fishery while concurrently opening waters of the Kirschner and Bruin Lakes and Paint River SHA's in the Kamishak Bay District, and the China Poot and Hazel Lake SHA's in the Southern District, to the harvest of salmon seven days per week by authorized agents of CIAA effective at 6:00 a.m. Monday, June 24, 1996, until further notice.</p> <p>This emergency order also opens portions of the China Poot, Tutka Bay, and Halibut Cove Subdistricts, all within the Southern District, to commercial salmon seining five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., effective 6:00 a.m. Monday, June 24, 1996, until further notice. In the China Poot Subdistrict, commercial seining shall be allowed five days per week only in those waters outside (offshore) of a line beginning at a marker on the mainland near the "Godfrey Cabin" west of Neptune Bay at approximately 59° 32' 38" N. latitude, 151° 25' 42" W. longitude, then to Lancashire Rock, then to the navigational light on Gull Island, then to Moosehead Point, effective June 24. In the Halibut Cove Subdistrict, seining shall be allowed only in waters outside of Halibut Cove Lagoon beginning June 24 on a five days per week basis. In the Tutka Bay Subdistrict, commercial seining is restricted to those waters seaward of a line extending from the "rock quarry" on the north side of the bay at approximately 59° 30' 14" N. latitude, 151° 28' 14" W. longitude, to the Tutka Bay Lodge on the south side of the bay at approximately 59° 28' 31" N. latitude, 151° 28' 55" W. longitude, five days per week effective 6:00 a.m. Monday, June 24, 1996.</p> <p>Also, this emergency order repeals the regulatory closed waters markers in China Poot Bay, and establishes temporary closed waters at the head of China Poot Bay to provide a Dungeness crab sanctuary.</p>
2-F-H-008-96 June 20	<p>This emergency order extends the weekly fishing periods for the commercial salmon seine fishery in those waters of Resurrection Bay in the Eastern District enclosed by a line from Aialik Cape south to a point one mile due south of Aialik Cape, then northeast to a point one mile due south of Cape Resurrection, then north to Cape Resurrection, to seven days per week, effective at 10:00 p.m. Friday, June 21, 1996, until further notice. All waters along the west shore of Resurrection Bay west of a line from the old military dock pilings north of Caines Head to the former Alaska state ferry dock (see LCI E.O. # 2-F-H-002-96) will remain closed to seining.</p>
2-F-H-009-96 June 24	<p>Re-opens waters of Port Graham Subdistrict, including the English Bay Section, in the Southern District to commercial salmon set gillnet fishing, effective at 6:00 a.m. Tuesday, June 25, until further notice.</p>

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Table 8. (page 3 of 5)

Number/ Issue Date	DESCRIPTION
2-F-H-010-96 June 27	This emergency order designates and establishes a Special Harvest Area for the Cook Inlet Aquaculture Association (CIAA) in the Tutka Bay Subdistrict within the Southern District of Lower Cook Inlet. In addition, this emergency order opens the Tutka Bay Special Harvest Area to the harvest and sale of salmon seven days per week by authorized agents of CIAA, effective at 6:00 a.m. Monday, July 1, 1996, until further notice. This emergency order also designates and establishes a Special Harvest Area for the Port Graham Hatchery Corporation (PGHC) in the Port Graham Subdistrict within the Southern District of Lower Cook Inlet.
2-F-H-011-96 June 25	Designates and establishes an English Bay Special Harvest Area (SHA) for the Port Graham Hatchery Corporation (PGHC) in the English Bay Section of Port Graham Subdistrict, located in the Southern District of the Lower Cook Inlet management area. This emergency order also opens the English Bay SHA to the harvest of salmon seven days per week by authorized agents of PGHC effective at 12:00 noon Tuesday, June 25, 1996, until further notice.
2-F-H-012-96 July 2	Extends fishing time for commercial set gillnets in Port Graham Subdistrict, including the English Bay Section, and Halibut Cove Subdistrict, both in the Southern District, to five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Wednesday, July 3, 1996, until further notice. In addition, this emergency order returns the weekly seine fishing schedule in waters of McNeil River Subdistrict of the Kamishak Bay District to the standard two 48-hour periods per week, from 6:00 a.m. Monday until 6:00 a.m. Wednesday and from 6:00 a.m. Thursday until 6:00 a.m. Saturday, also effective at 6:00 a.m. Wednesday, July 3, 1996, until further notice.
2-F-H-013-96 July 5	Opens waters of Aialik Subdistrict, including Aialik Lagoon, in the Eastern District to commercial salmon seining five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective 6:00 a.m. Monday, July 8, 1996, until further notice.
2-F-H-014-96 July 12	Closes commercial salmon seining in all waters of Resurrection Bay in the Eastern District effective at 12:00 midnight Sunday, July 14, 1996, until further notice. In addition, this emergency order opens those waters of the Port Dick Subdistrict in the Outer District east of a line from a department marker on the south shore of Port Dick near Phillipino Cove at approximately 151° 06' 00" W. longitude, 59° 15' 20" N. latitude, to a department marker on the southwest shore of Taylor Bay at approximately 151° 05' 00" W. longitude, 59° 16' 12" N. latitude, to commercial salmon seining for two 40-hour periods per week, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and from Thursday 6:00 a.m. until Friday 10:00 p.m., effective at 6:00 a.m.

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Table 8. (page 4 of 5)

Number/ Issue Date	DESCRIPTION
2-F-H-014-96 July 12 (cont'd)	Monday, July 15, 1996, until further notice. Waters open to fishing include statistical reporting areas 232-06 and 232-08. Waters of the North Section (232-09) and the south shore of the South Section (232-07) of the Port Dick Subdistrict remain closed to fishing.
2-F-H-015 July 16	Closes waters of the Kirschner and Bruin Lakes Special Harvest Areas (SHA's; see LCI E.O. # 2-F-H-007-96) in the Kamishak Bay District to hatchery cost recovery fishing by Cook Inlet Aquaculture Association (CIAA) effective at 9:00 a.m. Tuesday, July 16. These waters will subsequently open to commercial seining seven days per week, effective at 3:00 a.m. Wednesday, July 17, until further notice. At Bruin Lake Creek, no markers will be in effect and fishing is allowed up to the stream mouth. In addition, this emergency order opens waters of East Nuka Subdistrict to commercial salmon seining five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., effective at 6:00 a.m. Wednesday, July 17, until further notice. All normal regulatory markers will be in effect for this opening.
2-F-H-016 July 16	Closes waters of the China Poot and Hazel Lakes Special Harvest Areas (see LCI E.O. #2-F-H-007-96) in the Southern District to salmon hatchery cost recovery harvest by Cook Inlet Aquaculture Association effective at 4:00 p.m. Tuesday, July 16, 1996. In addition, this emergency order opens waters of China Poot Subdistrict, including both the China Poot and Hazel Lake Sections, to commercial salmon seining west (or offshore) of the regulatory markers located near the HEA power lines in China Poot Bay on a seven-day-per-week basis, effective at 10:00 a.m. Wednesday, July 17, until further notice. Waters of China Poot Bay east (or inshore) of these markers will open to commercial seining five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., also effective at 10:00 a.m. Wednesday, July 17, until further notice. The regulatory markers designating the Dungeness crab sanctuary in the north arm of China Poot Bay are still in effect for these openings. At China Poot Creek, the regulatory markers near the creek mouth will be in effect during the Monday through Saturday opening. At Neptune Bay, no markers will be in effect and fishing is allowed up to the Wosnesenski River mouth.
2-F-H-017 July 17	Closes waters of Port Graham Subdistrict, including the English Bay Section, in the Southern District to commercial salmon set gillnet fishing, effective at 6:00 a.m. Thursday, July 18, 1996, until further notice. The subsistence salmon set gillnet fishery in waters of the Port Graham Subdistrict will remain open.

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Table 8. (page 5 of 5)

Number/ Issue Date	DESCRIPTION
2-F-H-018-96 July 26	<p>Re-opens waters of Port Graham Subdistrict, including the English Bay Section, in the Southern District to commercial salmon set gillnet fishing, effective at 6:00 a.m. Monday, July 29, 1996, until further notice. The fishing schedule in these waters will be the standard two 48-hour periods per week, from Monday 6:00 a.m. until Wednesday 6:00 a.m. and from Thursday 6:00 a.m. until Saturday 6:00 a.m.</p> <p>In addition, this emergency order repeals the regulatory closed waters markers at both Desire Lake Creek and Delight Lake Creek in East Nuka Subdistrict of the Outer District, effective at 6:00 a.m. Monday, July 29, until further notice; salmon seining will be allowed up to the stream mouths at both locations during open fishing periods. Although purse seining will be allowed in salt waters of McCarty Lagoon near Delight Lake as a result of this marker change, fishing is not allowed in the fresh water lagoon of Delight Lake Creek. The current seining schedule of five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., remains in effect for this subdistrict.</p>
2-F-H-019-96 August 2	<p>Closes waters of the Port Graham Section of Port Graham Subdistrict in the Southern District to commercial salmon set gillnet fishing, effective at 6:00 a.m. Monday, August 5, 1996, until further notice. Waters of the English Bay Section of the Port Graham Subdistrict will remain open to set gillnetting on the standard two 48-hour weekly periods. Subsistence set gillnetting is not affected by this closure.</p>
2-F-H-020-96 August 14	<p>Delays the opening of the Southern District (Kachemak Bay) personal use set gillnet fishery for coho salmon until 6:00 a.m. Friday, August 16, 1996.</p>
2-F-H-021-96 August 15	<p>Closes waters of East Nuka Subdistrict to commercial salmon purse seining effective at 6:00 a.m. Saturday, August 17, until further notice.</p>
2-F-H-022-96 August 20	<p>Closes the Southern District (Kachemak Bay) personal use set gillnet fishery for coho salmon, effective at 6:00 a.m. Wednesday, August 21, 1996, for the remainder of the season.</p>
2-F-H-023-96 August 20	<p>Opens the Port Graham Special Harvest Area (see LCI E.O. No. 2-F-H-010-96) to the harvest of pink salmon seven days per week by authorized agents of Port Graham Hatchery Corporation (PGHC), effective at 10:00 a.m. Tuesday, August 20, 1996, until further notice. All fish obtained from this harvest will be utilized for hatchery brood stock purposes.</p>

Table 9. Total return of adult pink salmon to the Tutka Bay Hatchery in the Southern District of Lower Cook Inlet, 1996.

<u>COMMERCIAL HARVEST</u>	
Tutka Bay/Lagoon:	
Purse Seine	191
Set Gillnet	6,750 ^a
Hatchery Cost Recovery	<u>419,160</u>
TUTKA COMMERCIAL HARVEST	426,101
 <u>SPORT HARVEST</u>	
TOTAL SPORT HARVEST (Tutka Bay and Lagoon)	1,000
 <u>ESCAPEMENT</u>	
Tutka Creek and Channel	3,456
Tutka Hatchery Brood Stock	<u>138,021</u>
TOTAL ESCAPEMENT	141,477
<hr/>	
TOTAL RETURN	568,578

^a Based primarily on run timing, all of the set gillnet pink salmon catch in the Tutka Bay Subdistrict was apportioned to the Tutka Hatchery return.

Table 10. Commercial purse seine catch of sac roe herring in short tons and average roe recovery in percent, by statistical area and date, Kamishak Bay District, Lower Cook Inlet, 1996.

Date	Statistical Area	Nearest Location	No. of Permits	No. of Landings	Short Tons	Roe %
4/24	249-55	Chenik Head	56	73	2,919	10.13
	249-75	Contact Point	7	8	65	9.46
KAMISHAK BAY DISTRICT TOTALS			62	81	2,984	10.11

Table 11. Total biomass estimates and commercial catch of Pacific herring (*Clupea harengus pallasii*) in short tons by age class, Kamishak Bay District, Lower Cook Inlet, 1996, and 1997 forecast.

Age	1996 Est. Spawning Biomass	Percent by Weight	1996 Commercial Harvest	Percent by Weight	1996 Total Biomass	Percent by Weight	1997 Forecast Biomass	Percent by Weight
1								
2								
3	2,184.5	8.86	145.0	4.86	2,329.6	8.29%	807	3.19
4	3,010.5	12.21	281.4	9.43	3,291.9	11.82%	2,425	9.58
5	1,649.5	6.69	204.4	6.85	1,853.9	6.72%	3,672	14.51
6	2,061.3	8.36	288.2	9.66	2,349.5	8.55	1,892	7.48
7	1,901.0	7.71	261.1	8.75	2,162.1	7.85	2,116	8.36
8	10,700.8	43.40	1,406.3	47.13	12,107.0	43.94	1,731	6.84
9	1,417.7	5.75	180.8	6.06	1,598.6	5.79	9,808	38.76
10	406.8	1.65	51.3	1.72	458.1	1.66	1,327	5.24
11	236.7	0.96	29.5	0.99	266.2	0.96	362	1.43
12	818.6	3.32	102.3	3.43	920.9	3.33	207	0.82
13+	268.8	1.09	33.4	1.12	302.2	1.09	956	3.78
TOTALS	24,656.2	100.00	2,983.8	100.00	27,640.0	100.00	25,302	100.01

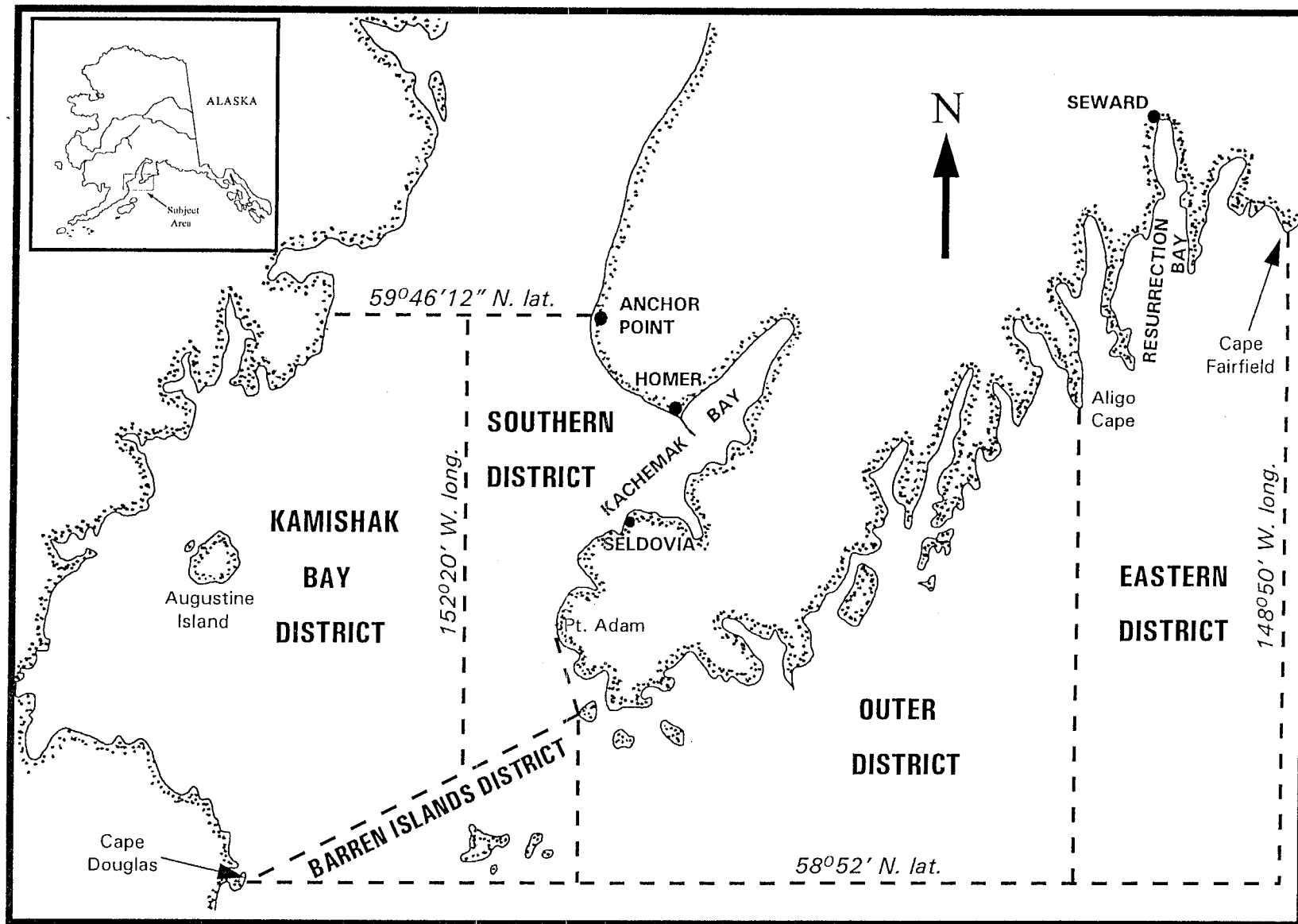


Figure 1. Lower Cook Inlet salmon and herring management area (not drawn to scale).

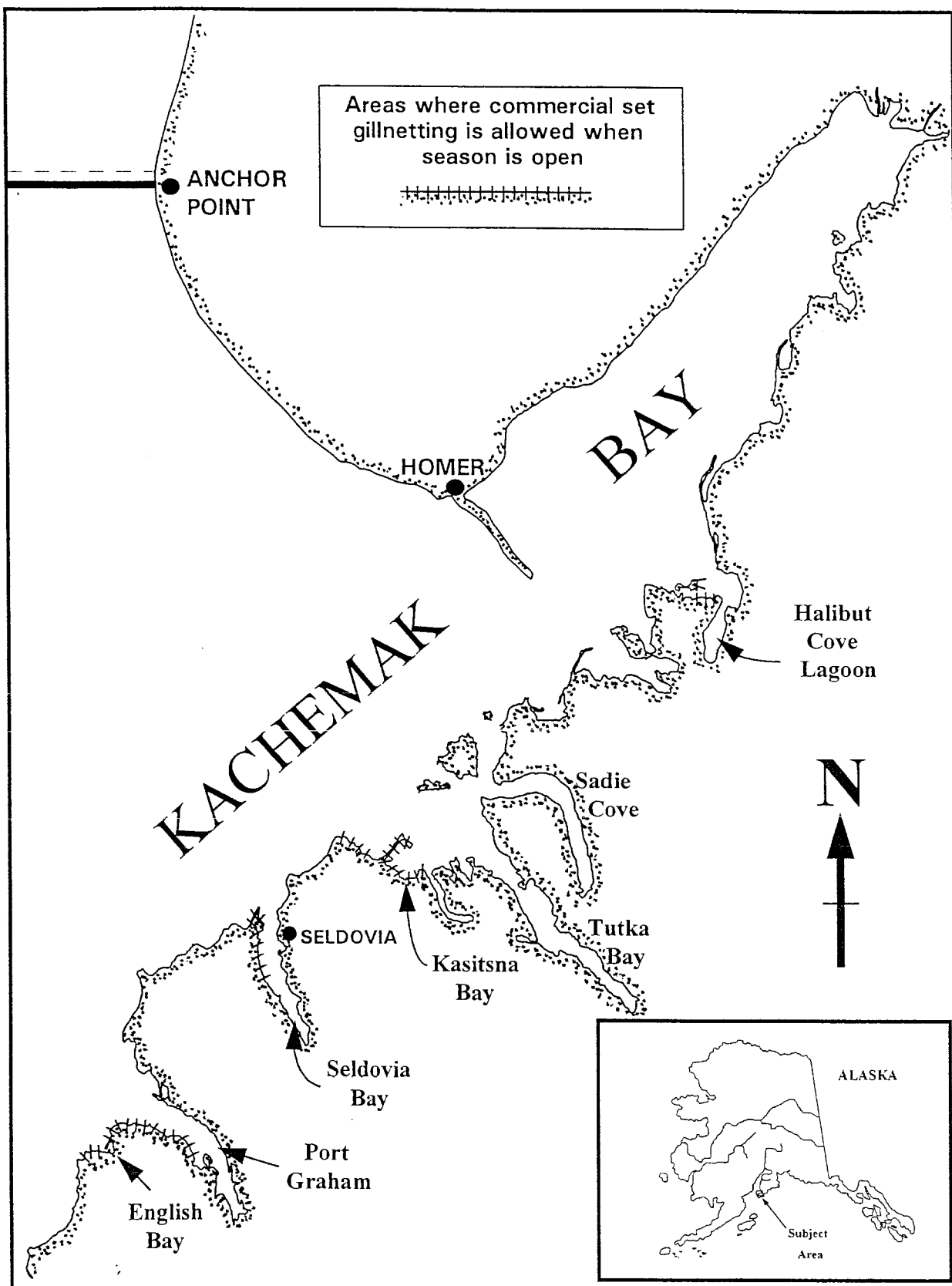


Figure 2. Commercial set gillnet locations in the Southern District of Lower Cook Inlet.

SOUTHERN DISTRICT SPECIAL HARVEST AREAS

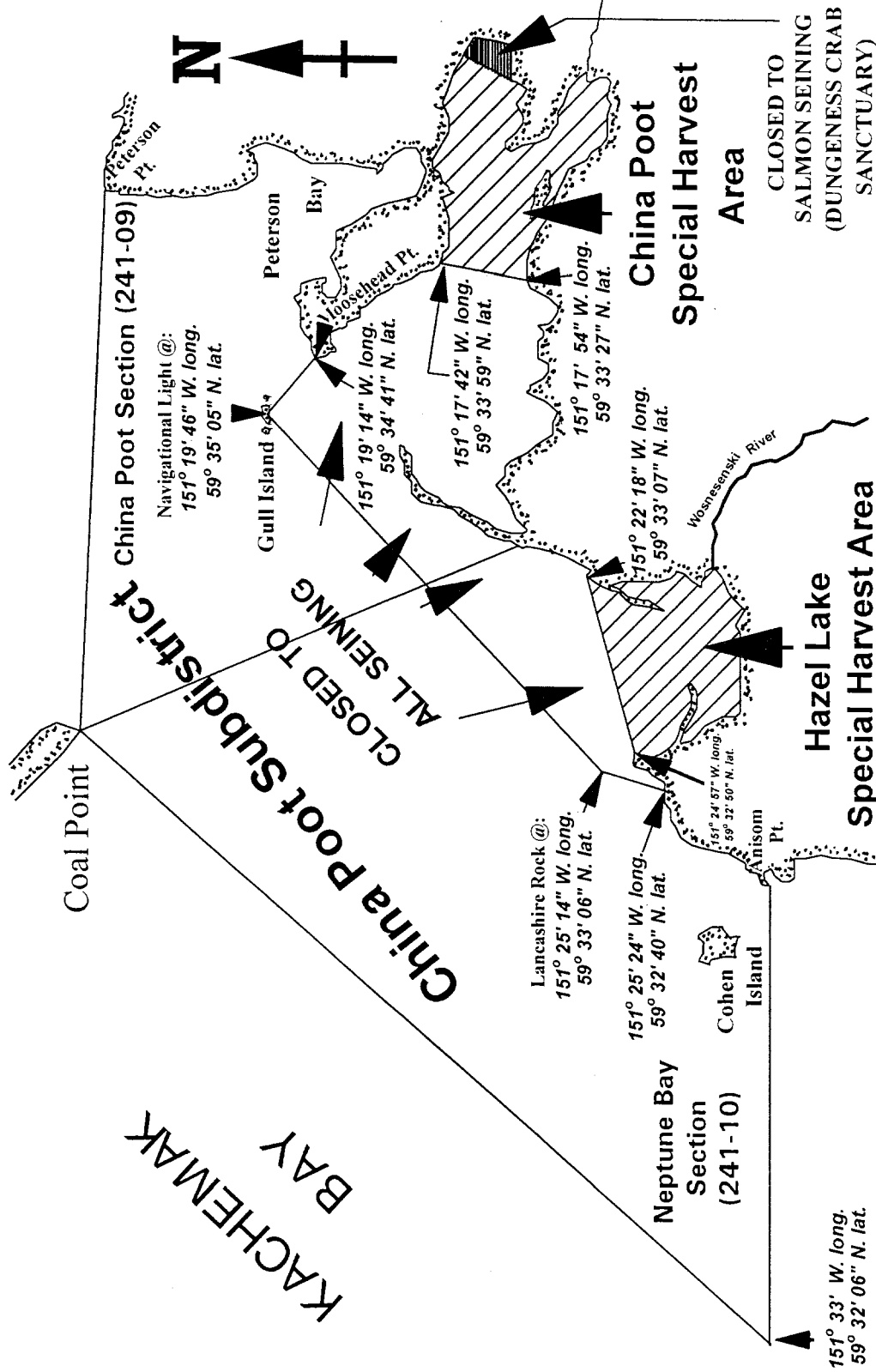


Figure 3. China Poot and Hazel Lake Special Harvest Areas for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

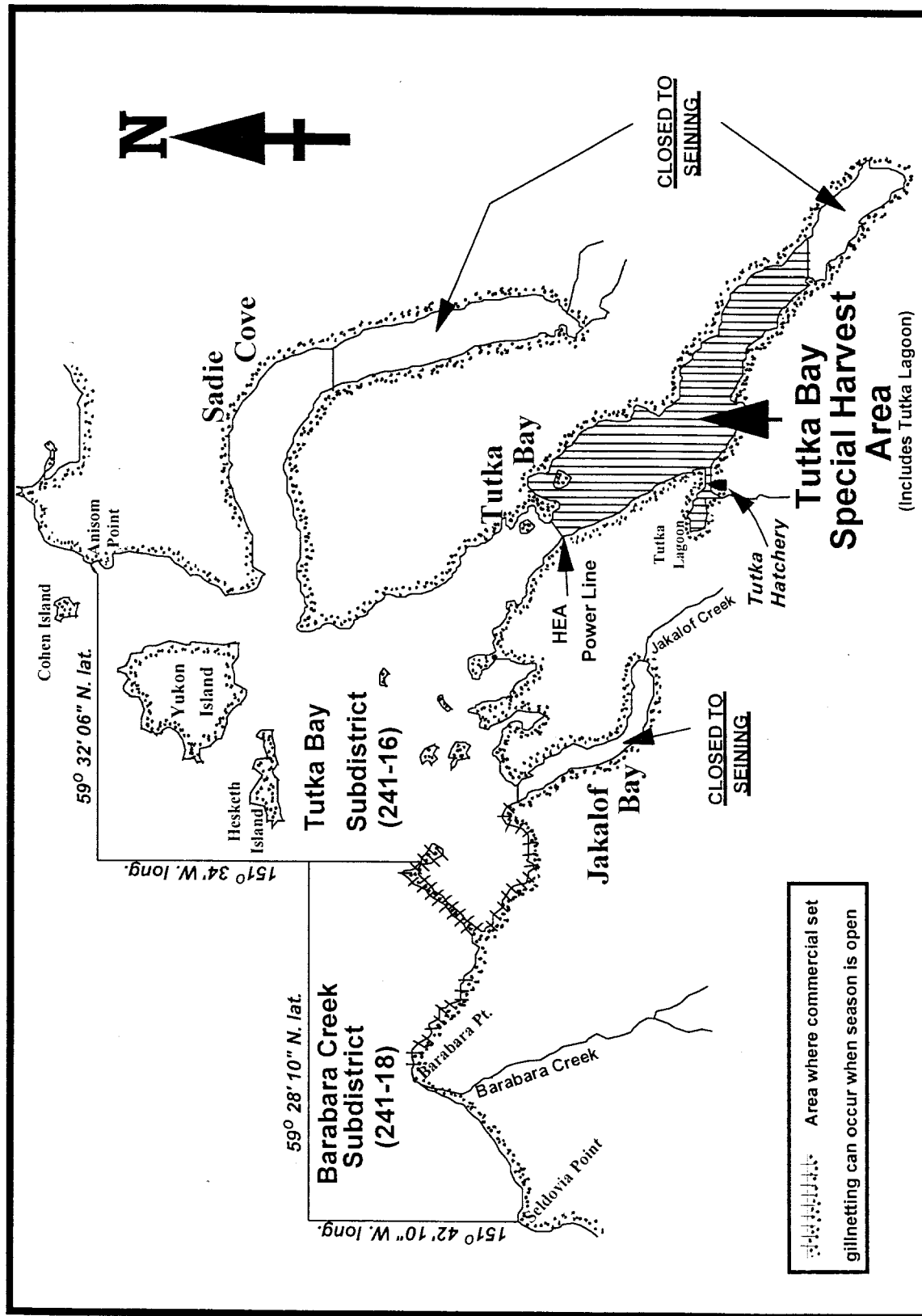


Figure 4. Tutka Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

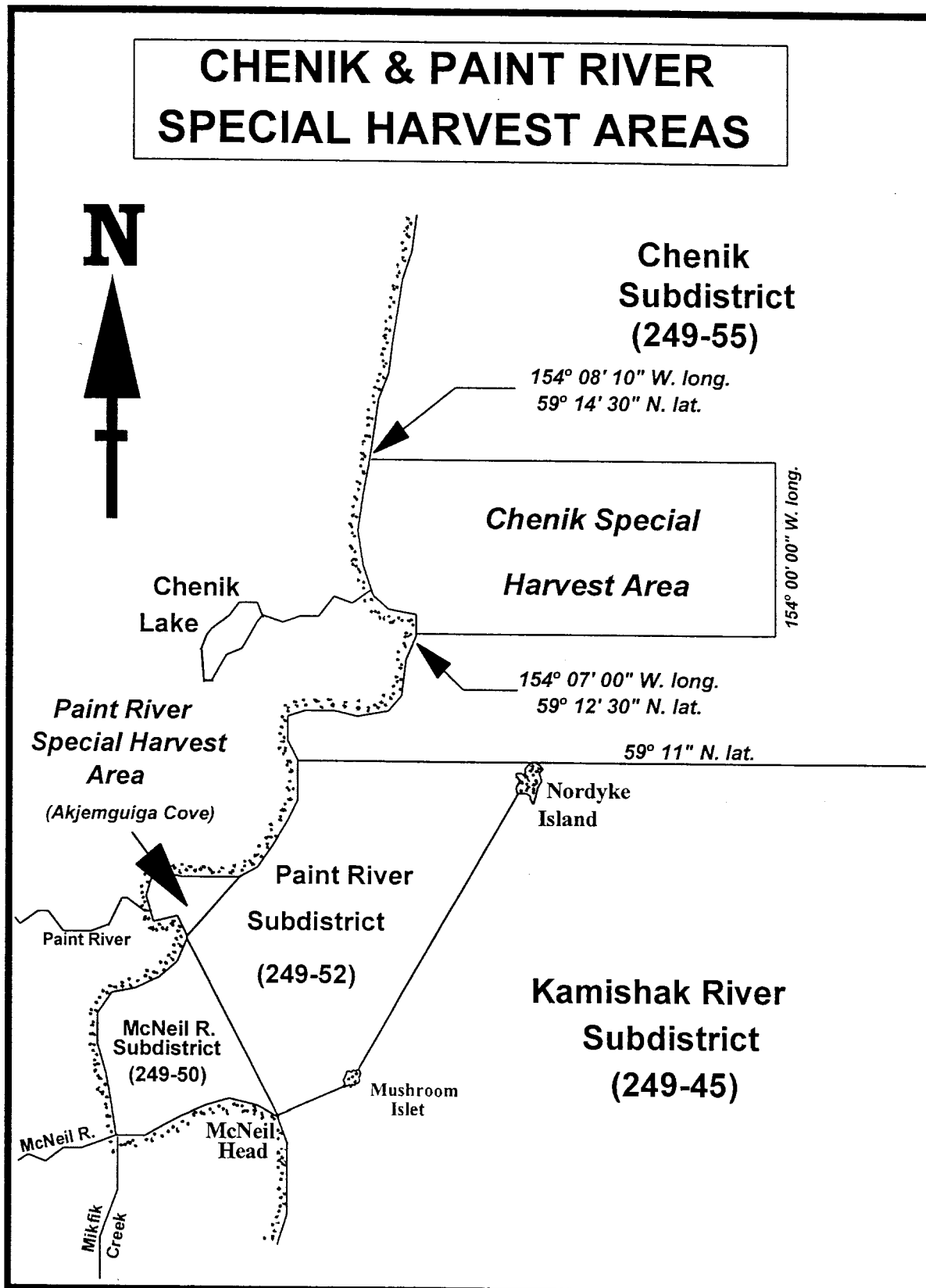


Figure 5. Chenik and Paint River Special Harvest Areas for salmon hatchery cost recovery in the Kamishak Bay District of Lower Cook Inlet.

KIRSCHNER & BRUIN LAKES SPECIAL HARVEST AREAS

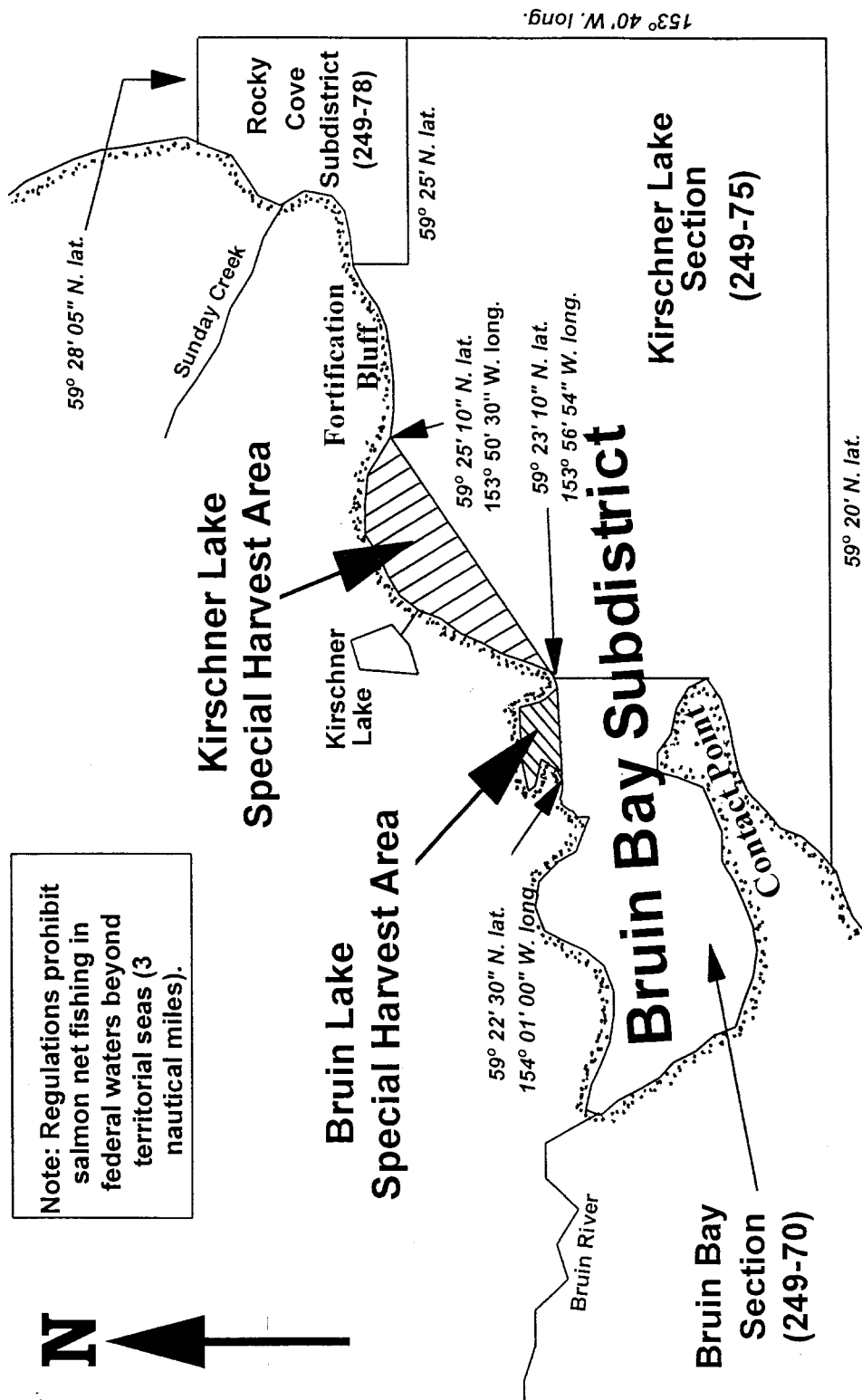


Figure 6. Kirschner and Bruin Lakes Special Harvest Areas for salmon hatchery cost recovery in the Kamishak Bay District of Lower Cook Inlet.

PORT GRAHAM HATCHERY SPECIAL HARVEST AREA

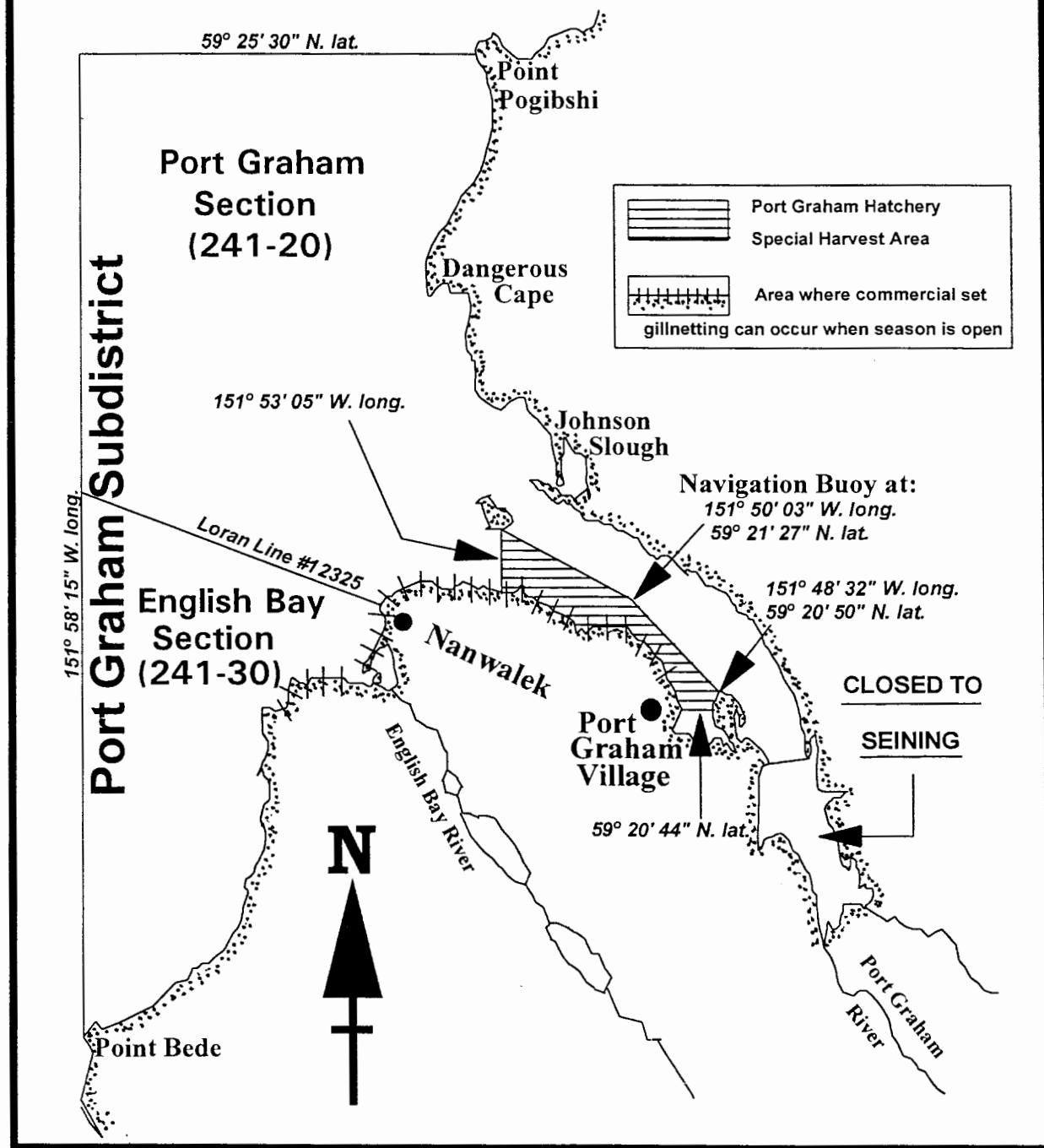


Figure 7. Port Graham Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

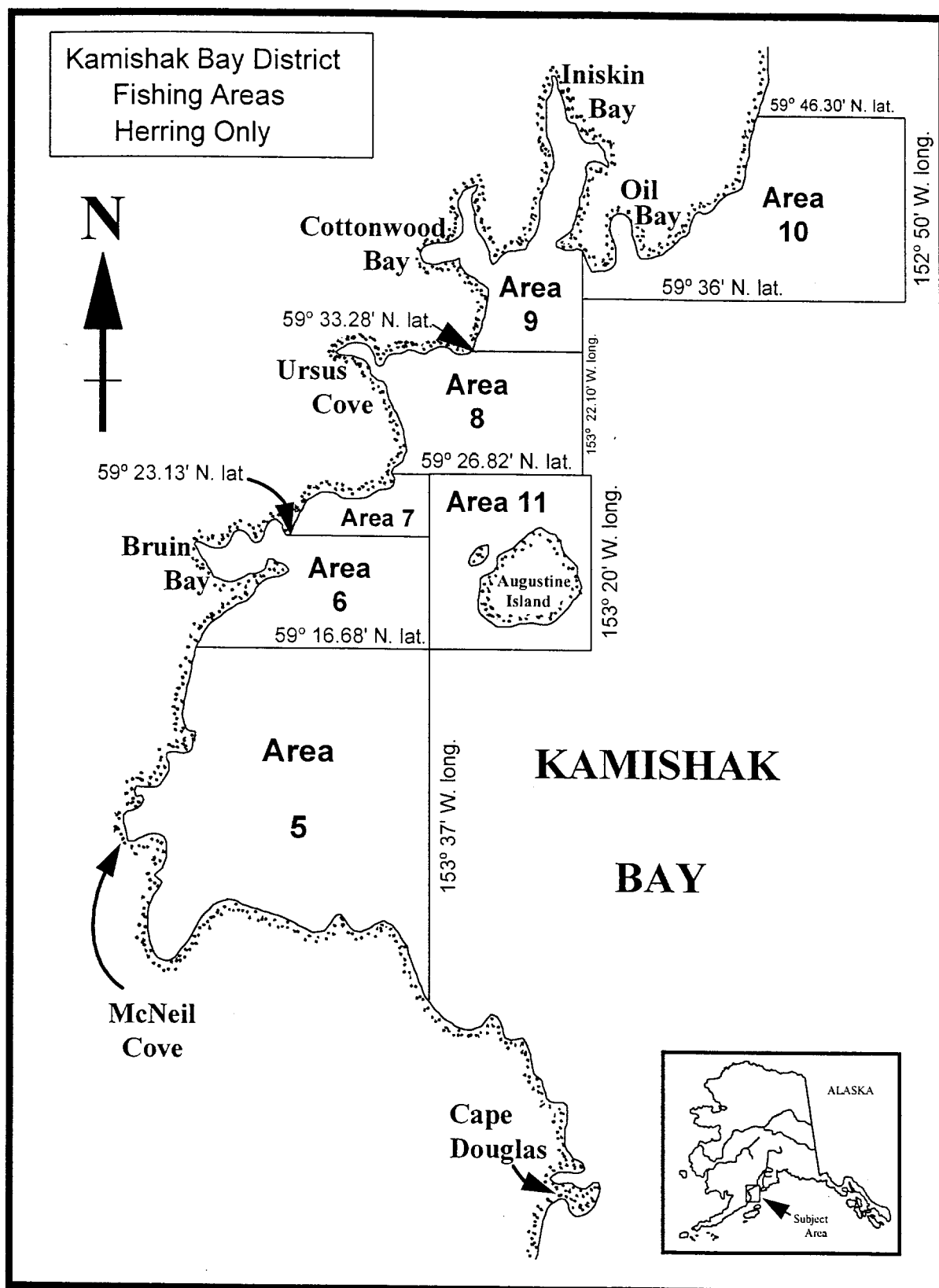


Figure 8. Commercial herring fishing areas in the Kamishak Bay District of Lower Cook Inlet.

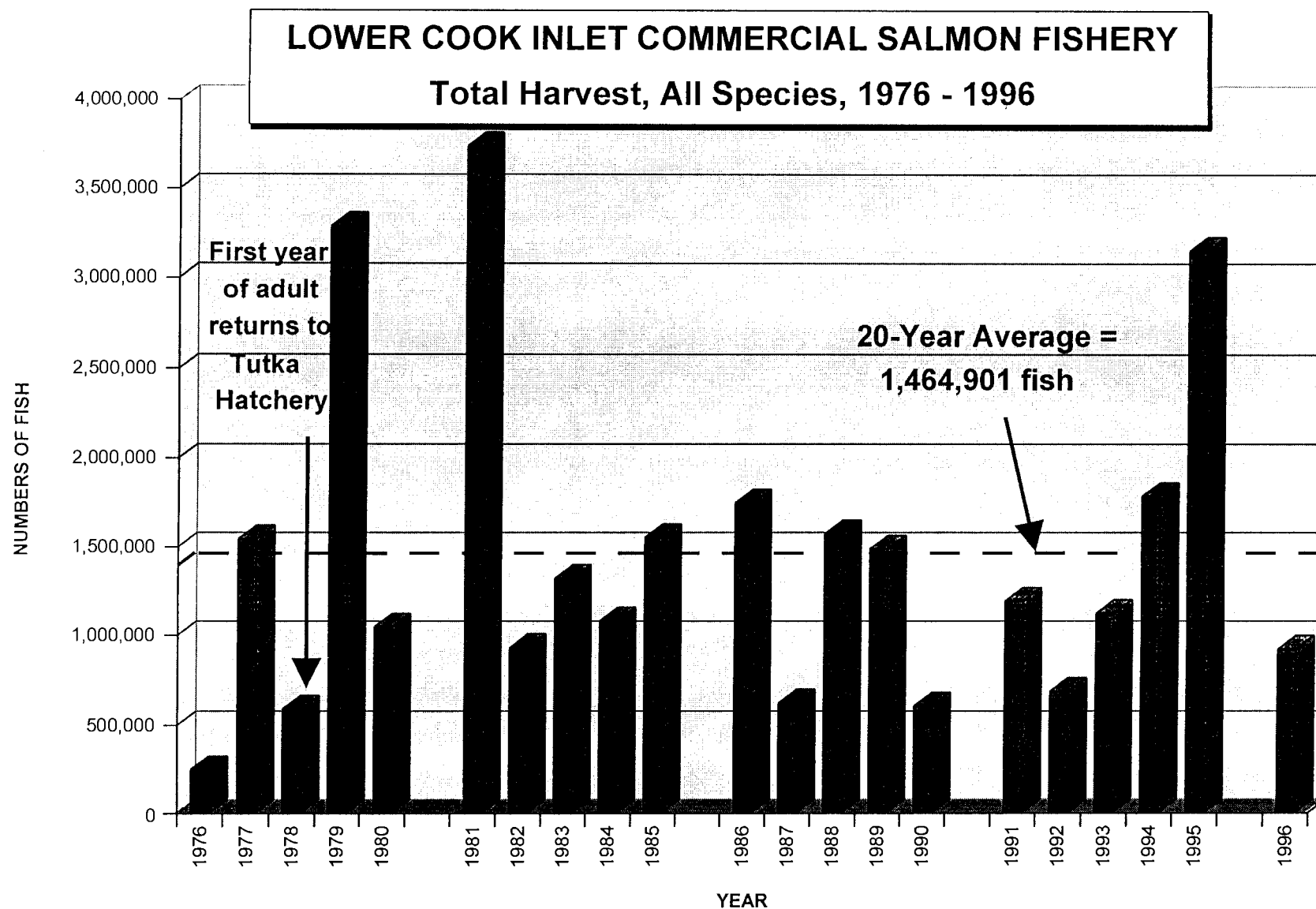


Figure 9. Total commercial salmon catch, Lower Cook Inlet, 1976 - 1996.

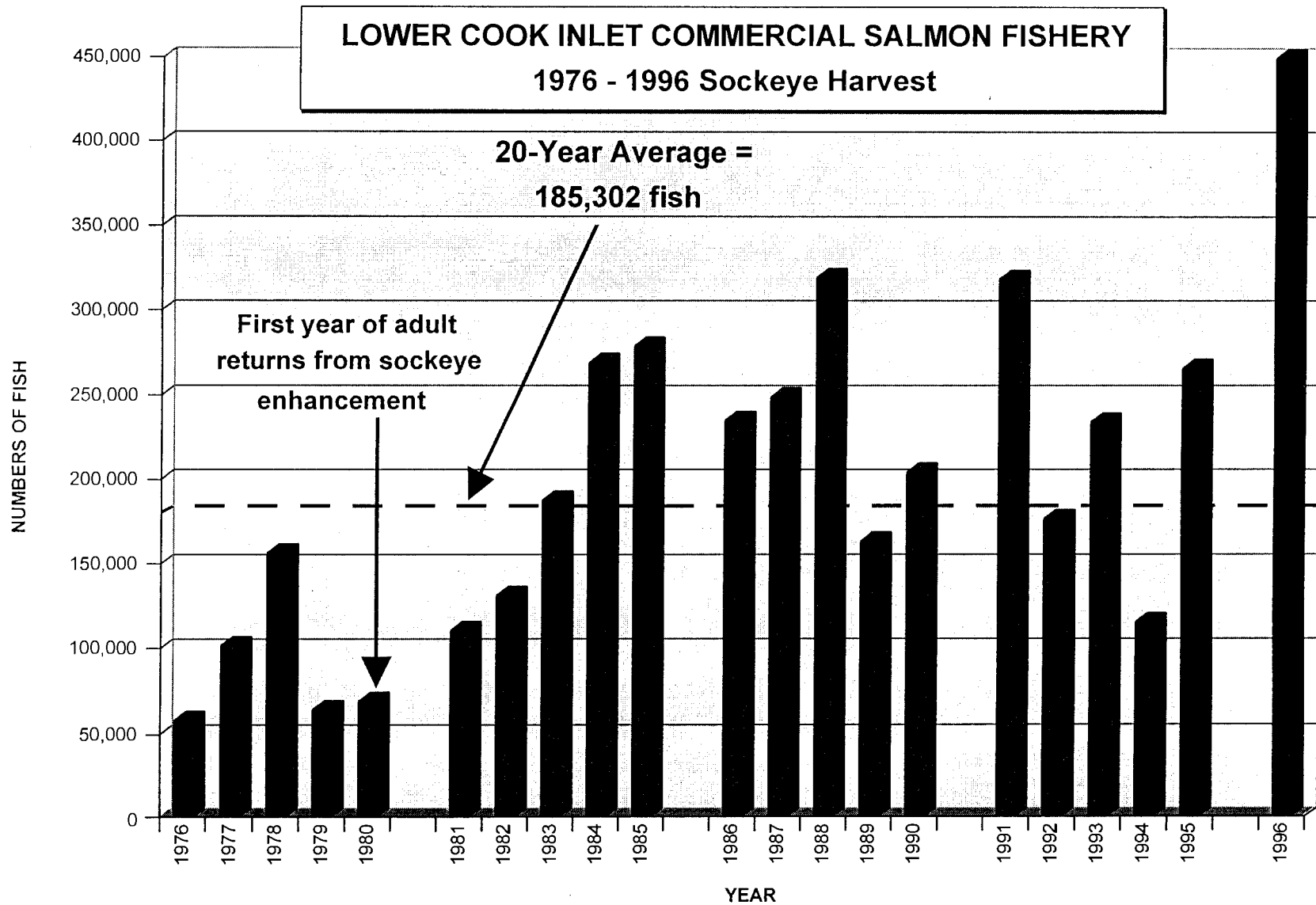


Figure 10. Commercial sockeye salmon catch, Lower Cook Inlet, 1976 - 1996.

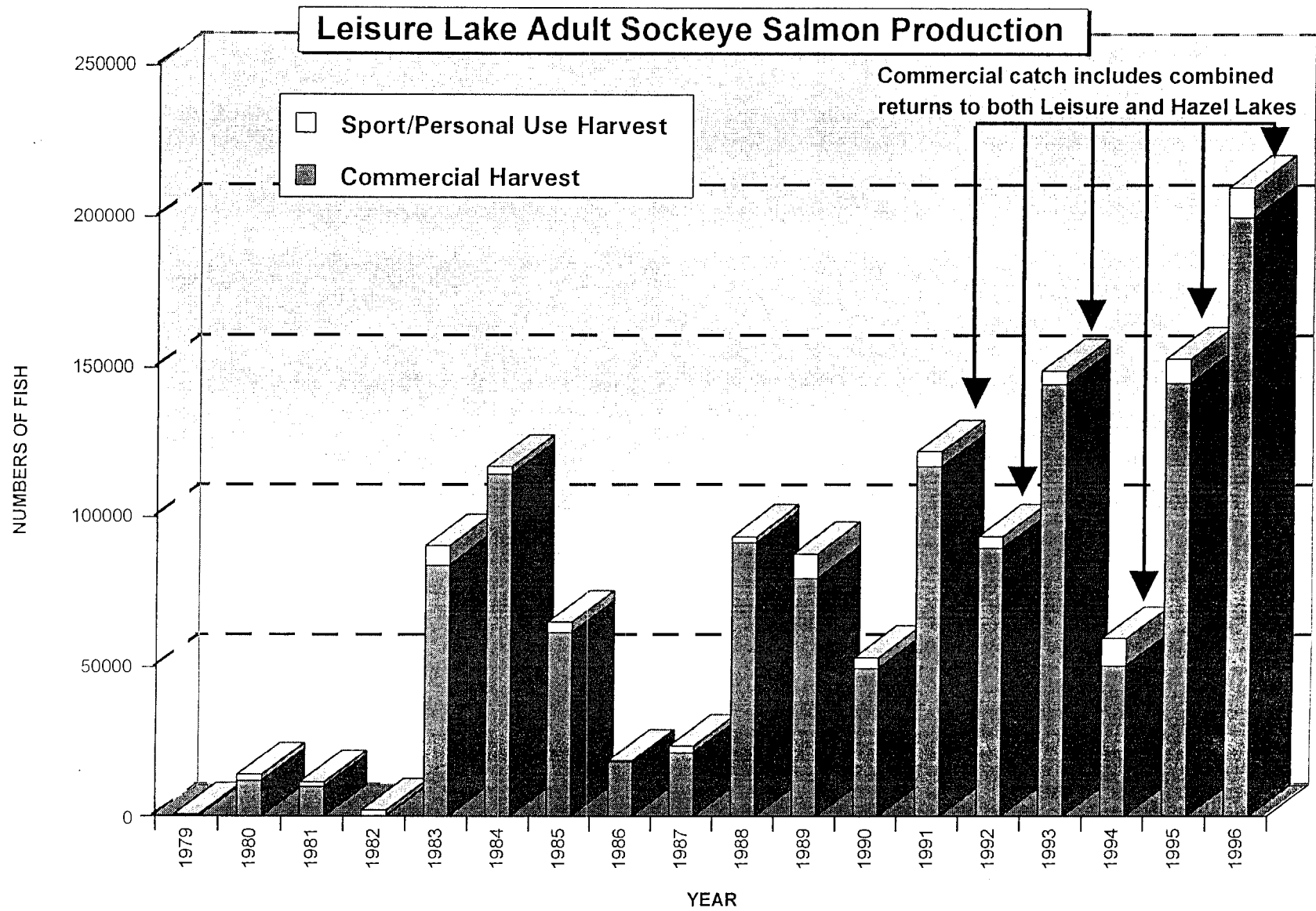


Figure 11. Sockeye salmon returns to Leisure and Hazel Lakes in the Southern District of Lower Cook Inlet, 1980 - 1996.

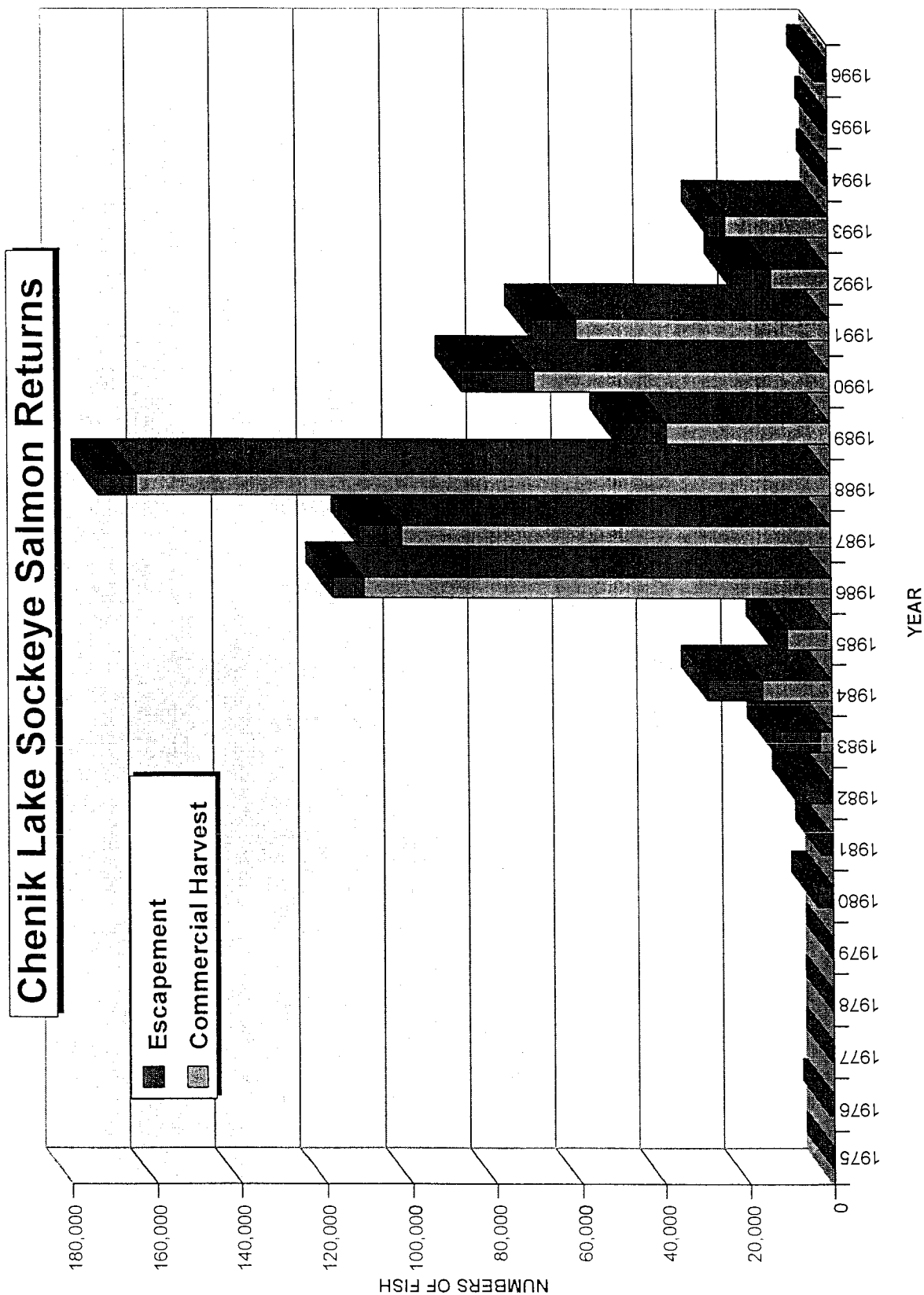


Figure 12. Sockeye salmon returns to Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 - 1996.

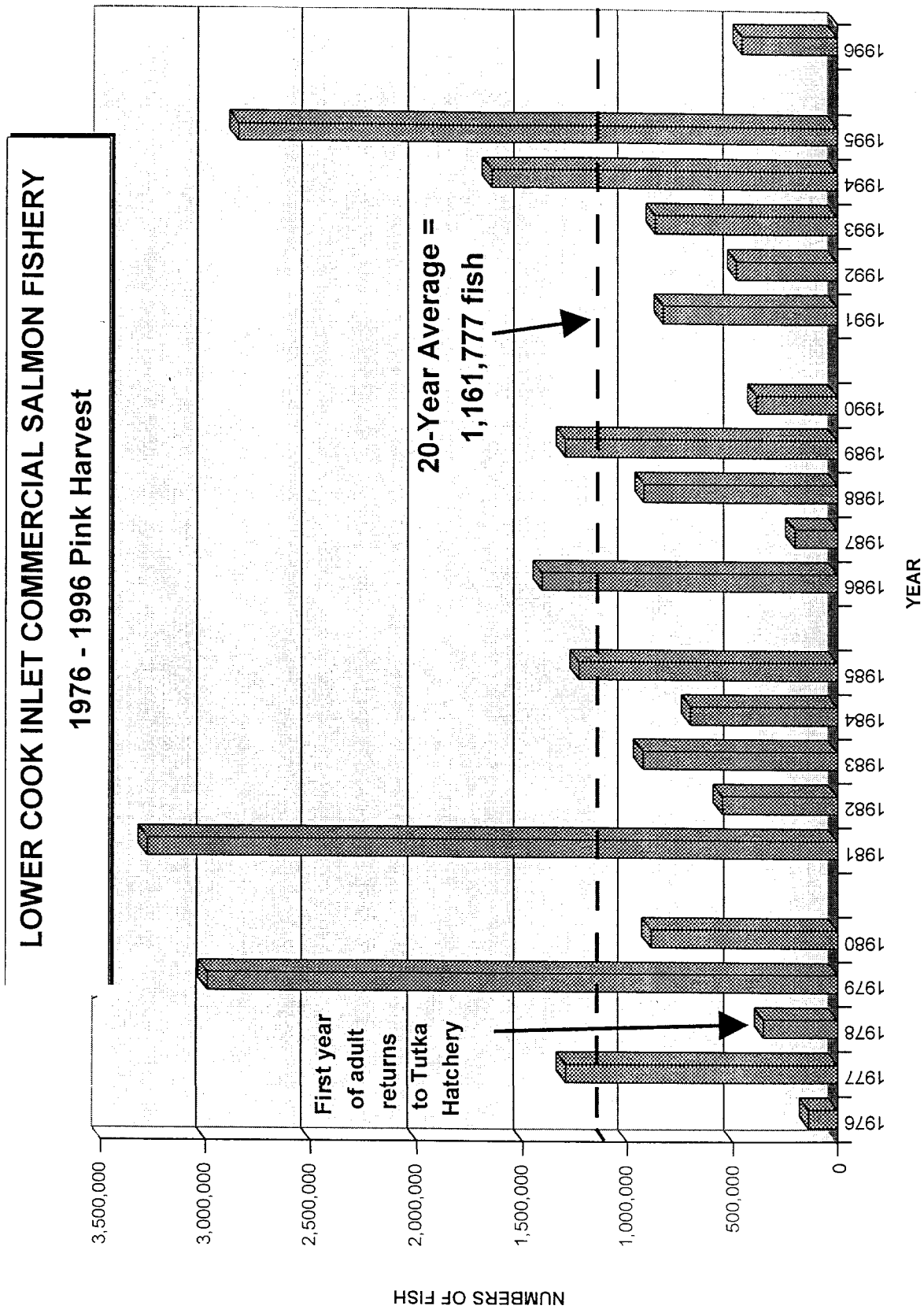


Figure 13. Commercial pink salmon catch, Lower Cook Inlet, 1976 - 1996.

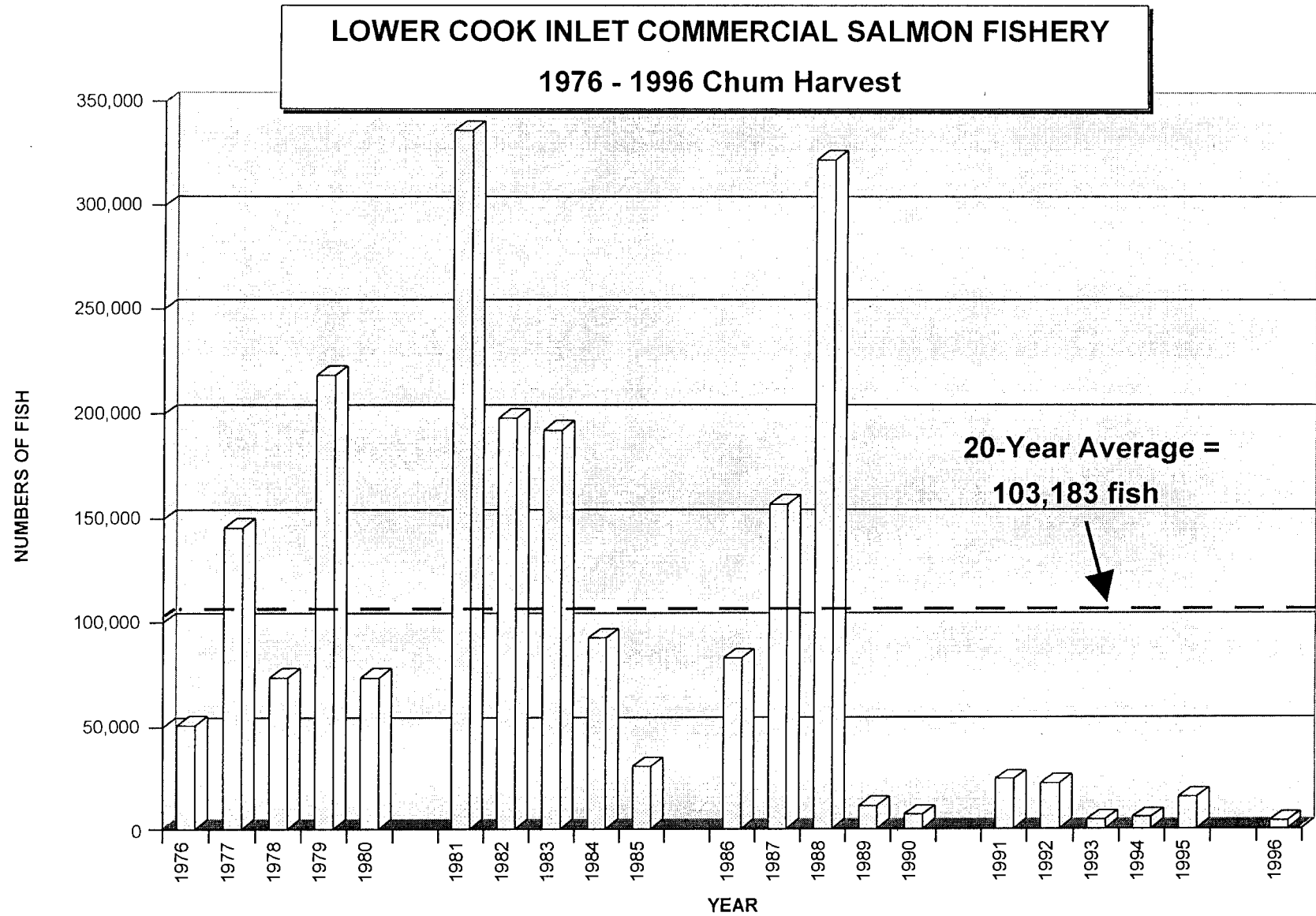


Figure 14. Commercial chum salmon catch, Lower Cook Inlet, 1976 - 1996.

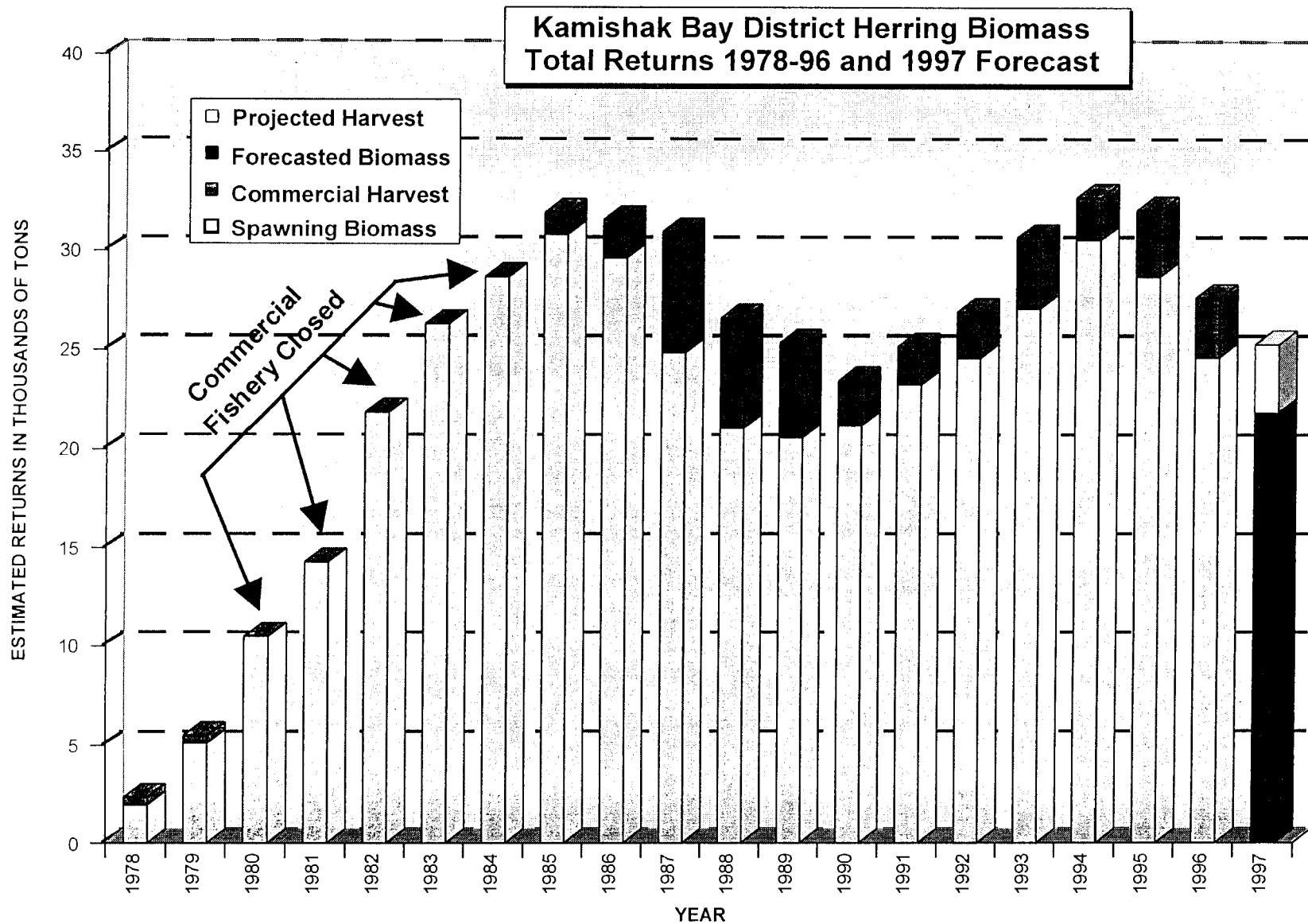


Figure 15. Biomass estimates and commercial harvests of Pacific herring in the sac roe seine fishery, Kamishak Bay District, Lower Cook Inlet, 1978 - 1996, and 1997 projection.

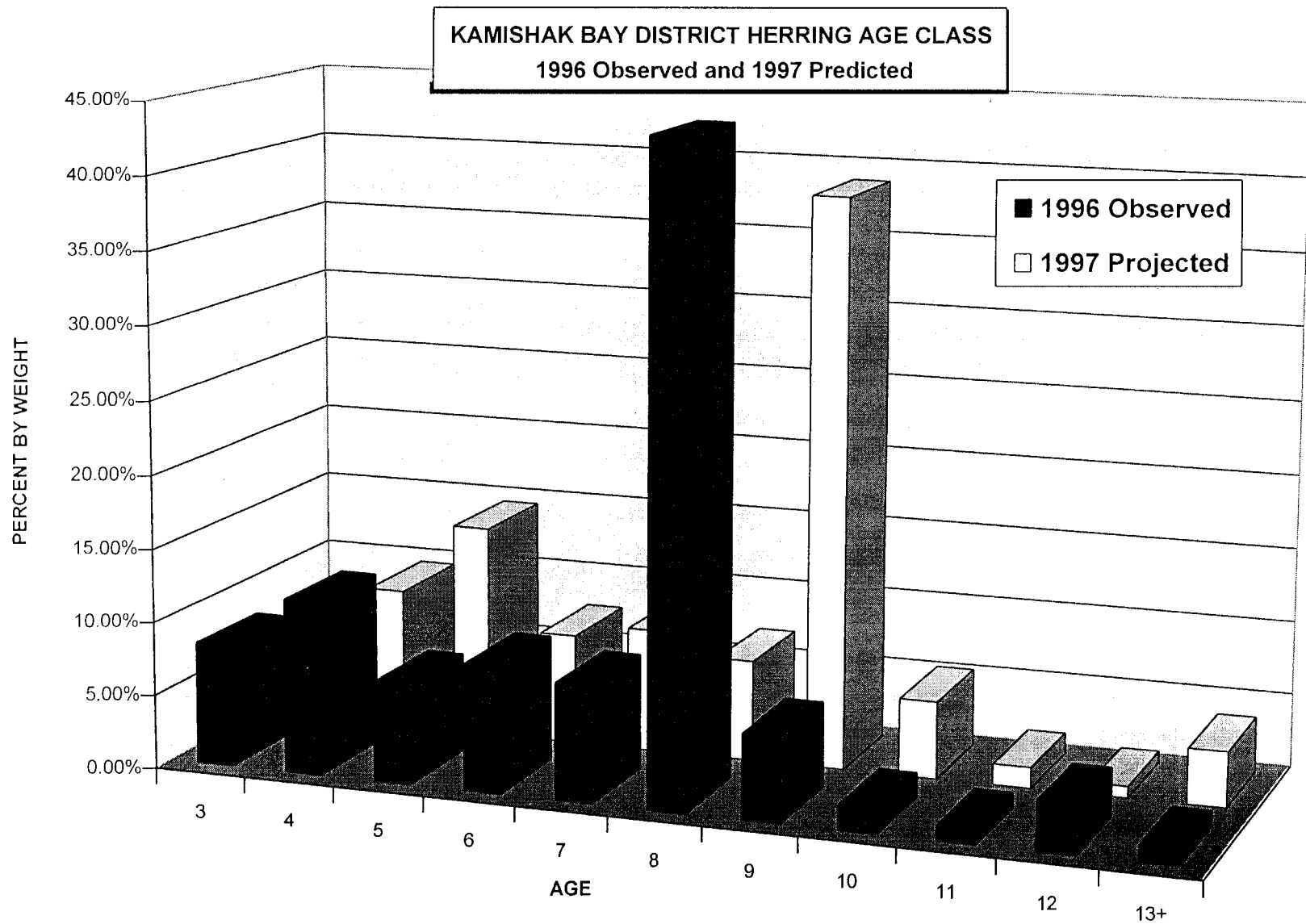


Figure 16. Herring age composition from samples collected in Kamishak Bay District, Lower Cook Inlet, 1996, and 1997 forecast.

Appendix Table 1. Salmon fishing permits issued and fished, by gear type, Lower Cook Inlet, 1976 - 1996^a.

Year	Seines				Set Net Permits fished
	Permanent Permits	Interim Permits	Total Issued	Actively fished	
1976	63	16	79	53	25
1977	72	10	82	72	26
1978	74	9	83	72	39
1979	75	9	84	75	38
1980	75	9	84	83	40
1981	75	10	85	85	40
1982	77	7	84	69	39
1983	78	5	83	83	24
1984	78	3	81	54	35
1985	80	1	81	51	34
1986	79	0	79	62	34
1987	79	0	79	66	29
1988	79	0	79	71	27
1989	83	0	83	64	23
1990	82	1	83	71	20
1991	82	1	83	68	20
1992	82	1	83	63	21
1993	82	1	83	51	17
1994	82	1	83	32	16
1995	83	1	84	49	23
1996	84	1	85	34	24
1976-95 Avg.	78	4	82	65	29
1986-95 Avg.	81	1	82	60	23

^a Data source: Commercial Fisheries Entry Commission and ADF&G fish ticket database.

Appendix Table 2. Exvessel value of the commercial salmon harvest in thousands of dollars by species, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	7	287	13	207	217	731
1977	7	620	9	1,719	604	2,959
1978	62	1,516	52	370	341	2,341
1979	36	621	68	4,495	1,097	6,317
1980	12	336	64	1,196	298	1,906
1981	18	740	69	5,334	1,346	7,507
1982	28	827	367	406	820	2,448
1983	20	704	57	696	513	1,990
1984	23	1,393	120	635	242	2,413
1985	47	1,637	86	974	78	2,822
1986	21	1,414	132	1,245	201	3,013
1987	27	1,951	118	295	598	2,989
1988	32	3,812	127	2,237	2,548	8,756
1989	33	1,213	59	1,660	39	3,004
1990	29	1,287	28	306	31	1,681
1991 ^b	19	1,115	36	275	48	1,493
1992 ^b	30	1,152	19	212	53	1,466
1993 ^b	27	802	41	287	7	1,164
1994 ^b	18	496	93	745	9	1,361
1995 ^b	48	1,381	62	1,245	24	2,760
1996 ^b	26	2,113	42	100	5	2,286
1976-95 Avg.	24	1,101	79	1,238	458	2,901
1996 % of Total	1.14	92.43	1.84	4.37	0.22	100.00

^a Values obtained by using the formula: (average price per lb.) x (average weight per fish) x (catch) = Exvessel value; average prices are determined only from fish ticket information and may not reflect retroactive or postseason adjustments.

^b Includes hatchery cost recovery.

Appendix Table 3. Average salmon price in dollars per pound by species, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum
1976	0.91	0.77	0.59	0.37	0.48
1977	1.07	0.86	0.55	0.35	0.45
1978	1.09	1.31	0.97	0.30	0.54
1979	1.54	1.53	0.89	0.43	0.60
1980	1.30	0.88	0.85	0.42	0.52
1981	1.35	1.10	0.75	0.44	0.49
1982	1.29	1.05	0.87	0.23	0.46
1983	1.00	0.75	0.70	0.25	0.29
1984	1.29	1.05	0.77	0.26	0.28
1985	1.60	1.25	0.85	0.22	0.31
1986	1.25	1.40	0.85	0.26	0.30
1987	1.25	1.60	1.00	0.42	0.46
1988	1.25	2.50	1.80	0.80	0.84
1989	1.25	1.60	0.70	0.40	0.40
1990	1.35	1.55	0.60	0.30	0.50
1991	1.12	0.83	0.29	0.13	0.27
1992	1.29	1.47	0.43	0.14	0.27
1993	1.02	0.80	0.51	0.12	0.28
1994	0.95	1.06	0.62	0.15	0.25
1995	1.17	1.11	0.47	0.15	0.24
1996	1.33	0.91	0.40	0.08	0.18
20-Year Avg.	1.19	1.20	0.75	0.32	0.42
1976-85 Avg.	1.15	0.99	0.74	0.34	0.45
1986-95 Avg.	1.23	1.41	0.77	0.29	0.39

^a Average prices are determined only from fish ticket information and may not reflect retroactive or postseason adjustments.

Appendix Table 4. Salmon average weight in pounds per fish by species in the commercial fishery, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum
1976	16.1	6.4	7.0	4.1	8.9
1977	30.1	7.2	5.9	3.8	9.2
1978	32.3	7.4	8.2	3.5	8.6
1979	18.9	6.3	6.2	3.5	8.2
1980	21.7	5.5	5.2	3.2	7.8
1981	12.5	6.1	8.5	3.7	8.1
1982	20.6	6.0	9.0	3.2	9.0
1983	22.8	5.0	7.2	3.0	9.2
1984	28.8	4.7	8.8	3.5	8.9
1985	28.0	4.7	9.8	3.5	8.2
1986	20.6	4.3	8.6	3.4	8.1
1987	18.1	4.9	8.2	3.5	8.3
1988	15.3	4.8	8.9	3.0	9.4
1989	14.1	4.6	7.0	3.1	8.6
1990	13.8	4.1	7.1	2.8	8.9
1991	12.3	4.2	6.6	2.6	7.5
1992	12.3	4.4	7.7	3.2	8.8
1993	12.0	4.4	6.0	2.7	6.2
1994	15.0	4.1	10.2	3.0	6.4
1995	17.8	4.7	7.4	2.9	6.4
1996	16.9	5.2	7.6	2.9	8.0
20-Year Avg.	19.9	5.3	7.7	3.3	8.3
1976-85 Avg.	23.7	6.1	7.5	3.5	8.6
1986-95 Avg.	16.2	4.4	8.0	3.1	8.0

^a Values obtained from ADF&G fish ticket database.

Appendix Table 5. Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	450	58,159	3,216	136,445	50,822	249,092
1977	217	101,597	1,798	1,293,932	145,789	1,543,333
1978	1,747	156,404	6,529	352,561	73,518	590,759
1979	1,238	64,417	12,393	2,990,929	218,490	3,287,467
1980	424	69,442	14,505	889,703	73,492	1,047,566
1981	1,086	110,255	10,776	3,279,183	336,093	3,737,393
1982	1,066	131,320	46,892	551,589	198,185	929,052
1983	873	187,645	11,219	927,607	192,319	1,319,663
1984	714	268,950	16,797	700,622	92,540	1,079,623
1985	1,043	278,694	10,327	1,229,708	30,640	1,550,412
1986	796	234,861	18,852	1,408,293	82,688	1,745,490
1987	1,179	248,848	14,354	201,429	157,018	622,828
1988	1,694	319,008	7,946	921,296	321,911	1,571,855
1989	1,893	163,271	12,089	1,296,926	11,305	1,485,484
1990	1,560	203,895	9,297	383,670	6,951	605,373
1991	1,419	317,947	19,047	828,709	24,232	1,191,354
1992	1,891	176,644	5,902	479,768	22,203	686,408
1993	2,168	233,834	13,477	866,774	4,367	1,120,620
1994	1,231	115,418	14,673	1,647,929	5,469	1,784,720
1995	2,303	265,423	17,709	2,848,464	15,636	3,149,535
1996	1,181	449,685	13,572	451,506	3,764	919,708
20-Year Avg.	1,250	185,302	13,390	1,161,777	103,183	1,464,901
1976-85 Avg.	886	142,688	13,445	1,235,228	141,189	1,533,436
1986-95 Avg.	1,613	227,915	13,335	1,088,326	65,178	1,396,367
1996 % of Total	0.13	48.89	1.48	49.09	0.41	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 6. Commercial salmon catch in numbers of fish by species in the Southern District, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	442	35,280	1,905	99,817	1,517	138,961
1977	182	54,663	1,255	157,025	6,734	219,859
1978	1,511	141,088	4,318	251,761	5,525	404,203
1979	1,199	37,342	10,846	986,909	8,221	1,044,517
1980	414	42,929	11,568	478,019	4,605	537,535
1981	1,024	77,880	7,976	1,453,982	20,920	1,561,782
1982	926	43,433	7,165	296,556	18,466	366,546
1983	858	133,671	3,433	690,254	14,281	842,497
1984	661	160,654	3,193	336,595	8,065	509,168
1985	1,007	84,149	4,258	518,889	5,513	613,816
1986	776	36,838	3,095	542,521	5,560	588,790
1987	1,158	89,662	2,163	90,522	5,030	188,535
1988	1,655	105,302	2,987	852,382	7,742	970,068
1989	1,889	98,052	6,667	987,488	3,141	1,097,237
1990	1,546	82,412	1,552	178,087	2,433	266,030
1991	1,399	170,224	9,415	253,962	1,962	436,962
1992	1,852	106,793	1,277	417,021	1,885	528,828
1993	2,162	159,747	4,431	692,794	2,788	861,922
1994	1,230	64,531	1,373	1,589,709	2,631	1,659,474
1995	2,289	164,798	5,161	2,475,312	4,530	2,652,090
1996	1,180	358,163	9,543	444,236	3,511	816,633
20-Year Avg.	1,209	94,472	4,702	667,480	6,577	774,441
1976-85 Avg.	822	81,109	5,592	526,981	9,385	623,888
1986-95 Avg.	1,596	107,836	3,812	807,980	3,770	924,994
1996 % of Total	0.14	43.86	1.17	54.40	0.43	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 7. Commercial set gillnet catch of salmon in numbers of fish by species in the Southern District, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	176	33,993	1,321	13,412	1,353	50,255
1977	175	54,404	869	38,064	2,765	96,277
1978	1,052	86,934	3,053	11,556	4,117	106,712
1979	483	34,367	7,595	69,368	5,266	117,079
1980	225	29,922	8,038	26,613	2,576	67,374
1981	222	53,665	6,735	68,794	8,524	137,940
1982	894	42,389	5,557	15,838	7,113	71,791
1983	822	41,707	1,799	20,533	4,377	69,238
1984	639	40,987	2,862	17,836	5,008	67,332
1985	958	23,188	3,908	22,898	4,221	55,173
1986	745	21,807	2,827	14,244	2,426	42,049
1987	653	28,209	2,025	9,224	2,419	42,530
1988	1,145	14,758	2,819	29,268	4,423	52,413
1989	1,281	13,970	4,792	16,210	1,877	38,130
1990	1,361	15,863	1,046	12,646	1,938	32,854
1991	842	20,525	5,011	3,954	1,577	31,909
1992	1,288	17,002	848	15,958	1,687	36,783
1993	1,089	14,791	3,088	12,008	2,591	33,567
1994	1,103	14,004	1,073	23,621	2,419	42,220
1995	2,078	19,406	3,564	41,654	3,958	70,660
1996	1,054	69,338	5,779	14,813	2,792	93,776
20-Year Avg.	862	31,095	3,442	24,185	3,532	63,114
1976-85 Avg.	565	44,156	4,174	30,491	4,532	83,917
1986-95 Avg.	1,159	18,034	2,709	17,879	2,532	42,312
1996 % of Total	1.12	73.94	6.16	15.80	2.98	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 8. Commercial salmon catch in numbers of fish by species in the Outer District, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	7	18,886	0	93	412	19,398
1977	34	33,733	78	1,129,250	70,167	1,233,262
1978	236	10,695	45	70,080	19,224	100,280
1979	30	25,297	135	1,945,536	180,558	2,151,556
1980	10	22,514	16	154,041	32,246	208,827
1981	61	18,133	485	1,714,115	238,393	1,971,187
1982	129	66,781	92	67,523	63,075	197,600
1983	14	16,835	54	199,794	27,203	243,900
1984	3	29,276	41	89,085	3,204	121,609
1985	19	91,957	3,210	618,222	11,844	725,252
1986	6	48,472	5,052	401,755	11,701	466,986
1987	14	31,845	2,481	23,890	28,663	86,893
1988	5	9,501	2	6,094	71,202	86,804
1989	1	10,286	72	52,677	43	63,079
1990	2	17,404	74	191,320	614	209,414
1991	2	6,408	12	359,664	14,337	380,423
1992	0	572	1	146	181	900
1993	2	4,613	119	159,159	970	164,863
1994	0	5,930	993	13,200	32	20,155
1995	12	17,642	1,272	192,098	474	211,498
1996	0	14,999	96	7,199	3	22,297
20-Year Avg.	29	24,339	712	369,387	38,727	433,194
1976-85 Avg.	54	33,411	416	598,774	64,633	697,287
1986-95 Avg.	4	15,267	1,008	140,000	12,822	169,102
1996 % of Total	0.00	67.27	0.43	32.29	0.01	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 9. Commercial salmon catch in numbers of fish by species in the Eastern District, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	0	5	200	35,423	45	35,673
1977	0	5,776	360	1,349	3,229	10,714
1978	0	2	582	29,738	100	30,422
1979	0	0	296	0	0	296
1980	0	122	426	155,779	720	157,047
1981	0	9,270	470	44,989	3,279	58,008
1982	0	3,092	950	143,639	7,698	155,379
1983	0	25,932	594	36,154	7,934	70,614
1984	47	54,420	536	136,797	10,535	202,335
1985	11	24,338	835	92,403	5,144	122,731
1986	0	3,055	770	40,243	3,757	47,825
1987	0	3,687	1,631	14,333	14,913	34,564
1988	1	20,253	486	1,740	24,668	47,148
1989	0	8,538	5,346	92	312	14,288
1990	0	7,682	7,645	11,815	307	27,449
1991	1	4,703	7,283	167,250	80	179,317
1992	0	432	3,136	60,007	86	63,661
1993	0	1,824	8,924	10,616	9	21,373
1994	1	9,661	10,410	44,987	2,792	67,851
1995	0	46,556	5,192	12,000	330	64,078
1996	0	44,919	3,932	36	223	49,110
20-Year Avg.	3	11,467	2,804	51,968	4,297	70,539
1976-85 Avg.	6	12,296	525	67,627	3,868	84,322
1986-95 Avg.	0	10,639	5,082	36,308	4,725	56,755
1996 % of Total	0.00	91.47	8.01	0.07	0.45	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 10. Commercial salmon catch in numbers of fish by species in the Kamishak Bay District, Lower Cook Inlet, 1976 - 1996^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1976	1	3,988	1,111	1,112	48,848	55,060
1977	1	7,425	105	6,308	65,659	79,498
1978	0	4,619	1,584	982	48,669	55,854
1979	9	1,778	1,116	58,484	29,711	91,098
1980	0	3,877	2,495	101,864	35,921	144,157
1981	1	4,972	1,845	66,097	73,501	146,416
1982	11	18,014	38,685	43,871	108,946	209,527
1983	1	11,207	7,138	1,405	142,901	162,652
1984	3	24,600	13,027	138,145	70,736	246,511
1985	6	78,250	2,024	194	8,139	88,613
1986	14	146,496	9,935	423,774	61,670	641,889
1987	7	123,654	8,079	72,684	108,412	312,836
1988	33	183,952	4,471	61,080	218,299	467,835
1989	3	46,395	4	256,669	7,809	310,880
1990	12	96,397	26	2,448	3,597	102,480
1991	17	136,612	2,337	47,833	7,853	194,652
1992	39	68,847	1,488	2,594	20,051	93,019
1993	4	67,650	3	4,205	600	72,462
1994	0	35,296	1,897	33	14	37,240
1995	2	36,427	6,084	169,054	10,302	221,869
1996	1	31,604	1	35	27	31,668
20-Year Avg.	8	55,023	5,173	72,942	53,582	186,727
1976-85 Avg.	3	15,873	6,913	41,846	63,303	127,939
1986-95 Avg.	13	94,173	3,432	104,037	43,861	245,516
1996 % of Total	0.00	99.80	0.00	0.11	0.09	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 11. Total commercial salmon catch in numbers of fish by district, Lower Cook Inlet, 1976 - 1996^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1976	138,961	19,398	55,060	35,673	249,092
1977	219,859	1,233,262	79,498	10,714	1,543,333
1978	404,203	100,280	55,854	30,422	590,759
1979	1,044,517	2,151,556	91,098	296	3,287,467
1980	537,535	208,827	144,157	157,047	1,047,566
1981	1,561,782	1,971,187	146,416	58,008	3,737,393
1982	366,546	197,600	209,527	155,379	929,052
1983	842,497	243,900	162,652	70,614	1,319,663
1984	509,168	121,609	246,511	202,335	1,079,623
1985	613,816	725,252	88,613	122,731	1,550,412
1986	588,790	466,986	641,889	47,825	1,745,490
1987	188,535	86,893	312,836	34,564	622,828
1988	970,068	86,804	467,835	47,148	1,571,855
1989	1,097,237	63,079	310,880	14,288	1,485,484
1990	266,030	209,414	102,480	27,449	605,373
1991	436,962	380,423	194,652	179,317	1,191,354
1992	528,828	900	93,019	63,661	686,408
1993	861,922	164,863	72,462	21,373	1,120,620
1994	1,659,474	20,155	37,240	67,851	1,784,720
1995	2,652,090	211,498	221,869	64,078	3,149,535
1996	816,633	22,297	31,668	49,110	919,708
20-Year Avg.	737,563	433,194	186,727	70,539	1,428,023
1976-85 Avg.	623,888	697,287	127,939	84,322	1,533,436
1986-95 Avg.	840,903	169,102	245,516	56,755	1,312,276
1996 % of Total	88.79	2.42	3.44	5.34	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 12. Commercial chinook salmon catch in numbers of fish by district, Lower Cook Inlet, 1976 - 1996^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1976	442	7	1	0	450
1977	182	34	1	0	217
1978	1,511	236	0	0	1,747
1979	1,199	30	9	0	1,238
1980	414	10	0	0	424
1981	1,024	61	1	0	1,086
1982	926	129	11	0	1,066
1983	858	14	1	0	873
1984	661	3	3	47	714
1985	1,007	19	6	11	1,043
1986	776	6	14	0	796
1987	1,158	14	7	0	1,179
1988	1,655	5	33	1	1,694
1989	1,889	1	3	0	1,893
1990	1,546	2	12	0	1,560
1991	1,399	2	17	1	1,419
1992	1,852	0	39	0	1,891
1993	2,162	2	4	0	2,168
1994	1,230	0	0	1	1,231
1995	2,289	12	2	0	2,303
1996	1,180	0	1	0	1,181
20-Year Avg.	1,209	29	8	3	1,250
1976-85 Avg.	822	54	3	6	886
1986-95 Avg.	1,596	4	13	0	1,613
1996 % of Total	99.92	0.00	0.08	0.00	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 13. Commercial sockeye salmon catch in numbers of fish by district, Lower Cook Inlet, 1976 - 1996^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1976	35,280	18,886	3,988	5	58,159
1977	54,663	33,733	7,425	5,776	101,597
1978	141,088	10,695	4,619	2	156,404
1979	37,342	25,297	1,778	0	64,417
1980	42,929	22,514	3,877	122	69,442
1981	77,880	18,133	4,972	9,270	110,255
1982	43,433	66,781	18,014	3,092	131,320
1983	133,671	16,835	11,207	25,932	187,645
1984	160,654	29,276	24,600	54,420	268,950
1985	84,149	91,957	78,250	24,338	278,694
1986	36,838	48,472	146,496	3,055	234,861
1987	89,662	31,845	123,654	3,687	248,848
1988	105,302	9,501	183,952	20,253	319,008
1989	98,052	10,286	46,395	8,538	163,271
1990	82,412	17,404	96,397	7,682	203,895
1991	170,224	6,408	136,612	4,703	317,947
1992	106,793	572	68,847	432	176,644
1993	159,747	4,613	67,650	1,824	233,834
1994	64,531	5,930	35,296	9,661	115,418
1995	164,798	17,642	36,427	46,556	265,423
1996	358,163	14,999	31,604	44,919	449,685
20-Year Avg.	94,472	24,339	55,023	11,467	185,302
1976-85 Avg.	81,109	33,411	15,873	12,296	142,688
1986-95 Avg.	107,836	15,267	94,173	10,639	227,915
1996 % of Total	79.65	3.34	7.03	9.99	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 14. Commercial sockeye salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 - 1996^a.

Location	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Resurrection Bay	0	0.1	0	0	0	0	0	0	0	74.5	99.4	1.8	2.2
Aialik Bay	1.3	0.2	4.3	2.6	0.5	0	0	0	0	0	0	3.1	0
Nuka Bay	8.3	6.7	8.2	5.1	0.5	0	2.0	0	2.2	1.5	0	1.0	1.6
Port Dick	0	0	0	0	0	0	0	0	0	0	0	0	0
Halibut Cove & Lagoon	1.3	1.4	0.8	2.0	1.1	0.7	1.4	1.5	1.9	2.7	1.7	1.3	1.3
Tutka/Barabara	1.1	1.7	3.0	5.2	2.9	9.0	5.2	6.0	11.8	6.3	5.6	6.0	10.0
Seldovia Bay	0.4	1.2	1.2	1.7	1.2	2.1	0.9	1.0	2.2	1.9	1.1	1.2	1.5
Port Graham Bay	6.6	7.8	5.2	6.8	7.8	5.5	3.5	2.7	10.4	7.7	4.3	3.7	5.6
Kamishak/Douglas	0	0	0	0	0	0	0	0	0	0	0	0	0
McNeil (Mikfik)	0	0.7	0	0	0	1.9	0.2	0	0	0	8.9	2.8	0
Paint River	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenik Lake	0	0	0	0	0	0	0	0	0.2	0	1.9	0	0
Bruin (Kirschner)	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	2.6	4.9	0.1	1.9	1.1	1.5	0.8	4.1	0.3	0.6	0.1	0	0
Totals	21.6	24.7	22.8	25.3	15.1	20.7	14.0	15.3	29.0	95.2	122.8	20.9	22.2

Location	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Resurrection Bay	0.1	0	0	0	0	0	0	0	0	0.6	0	0	3.4
Aialik Bay	0.3	3.1	0.2	0.6	0	5.8	0	0	0.1	8.7	3.0	25.9	50.8
Nuka Bay	26.1	1.1	0.1	0	18.9	31.1	10.6	24.4	21.5	17.2	66.3	16.8	29.2
Port Dick	0	0	0	0	0	0	0	0	0	0	0	0	0
Halibut Cove & Lagoon	3.7	2.1	3.0	3.4	5.1	3.6	12.9	5.3	11.5	11.2	1.2	77.7	116.6
Tutka/Barabara	14.8	8.1	10.8	12.6	14.2	21.3	92.1	15.6	13.2	41.0	15.8	35.9	26.7
Seldovia Bay	2.3	2.2	2.3	2.1	2.1	3.0	5.6	2.6	1.6	5.3	5.0	6.7	4.9
Port Graham Bay	10.5	11.7	10.9	9.2	13.6	16.6	30.5	12.9	16.5	20.3	21.5	13.4	12.5
Kamishak/Douglas	0	0	0	0	0.2	5.3	4.6	0.5	0	4.9	0	2.8	0
McNeil (Mikfik)	0	0	0	0	3.8	2.1	0	1.2	3.9	0	17.8	5.8	10.7
Paint River	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenik Lake	0	0	0	0	0	0	0	0	0	0	0.3	2.7	13.9
Bruin (Kirschner)	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	0.1	0.8	0.1	0.2	0.3	2.8	0.1	1.9	1.1	1.1	0.4	0	0.3
Totals	57.9	29.1	27.4	28.1	58.2	101.6	156.4	64.4	69.4	110.3	131.3	187.6	269.0

Location	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Resurrection Bay	0.3	0	0.2	0	0	0	0	0	1.7	9.0	44.6	43.9	
Aialik Bay	24.1	3.0	3.5	20.2	8.5	7.7	4.7	0.4	0.2	0.6	2.0	1.0	
Nuka Bay	91.8	48.4	31.8	9.5	10.3	5.7	1.8	0	3.5	5.9	17.6	15.0	
Port Dick	0	0	0	0	0	11.7	4.6	0.6	1.0	0	0	0	
Halibut Cove & Lagoon	63.2	15.2	69.1	24.9	46.6	20.3	36.0	14.7	19.0	12.2	9.0	75.3	
China Poot ^b				63.6	35.8	49.9	116.7	76.0	127.6	38.7	133.4	225.2	
Tutka/Barabara	14.9	16.3	14.7	12.9	13.4	7.9	13.4	12.9	8.4	11.0	15.4	27.8	
Seldovia Bay	2.6	3.2	3.5	2.5	1.8	4.3	4.0	3.3	4.4	2.7	4.2	11.9	
Port Graham Bay	3.5	2.0	2.4	1.4	0	0	0	0	0	0	2.6	17.9	
Kamishak/Douglas	0.7	7.6	2.3	5	0	0.1	7.0	9.9	1.3	3.4	2.7	0	
McNeil (Mikfik)	67.0	27.5	21.4	14.6	7.0	9.1	12.9	4.0	0.9	0	0.1	0	
Paint River	0	0	0	0	0	0	0.4	0	0	0	0	0	
Chenik Lake	10.6	111.3	98.5	164.2	38.9	70.3	60.4	14.4	24.6	0	0	0	
Bruin/Kirschner	0	0	0	0	0.2	14.5	55.9	40.5	39.7	31.9	33.6	31.6	
Miscellaneous	0	0.4	1.6	0.2	0.8	2.4	0.1	0	1.5	0	0.2	0	
Totals	278.7	234.9	248.8	319.0	163.3	203.9	317.9	176.6	233.8	115.4	265.4	449.7	

^a Data source: ADF&G fish ticket database.

^b China Poot Subdistrict, which includes China Poot, Peterson, and Neptune Bays, was part of Halibut Cove Subdistrict prior to 1988.

Appendix Table 15. Harvest of sockeye salmon returns to China Poot Bay in the Southern District of Lower Cook Inlet, by user group, 1979 - 1996^a.

Return Year	Sport Harvest	Personal Use Harvest	Commercial Harvest	Non-harvested fish	Total Return
1979	650	0	^b	0	650
1980	1,000	1,000	12,000	0	14,000
1981	1,500	0	10,000	0	11,500
1982	450	1,320	200	1,430	3,400
1983	480	5,910	84,020	10	90,420
1984	500	2,000	114,360	500	117,360
1985	500	3,000	61,500	920	65,920
1986	100	150	18,350	200	18,800
1987	200	2,000	21,500	0	23,700
1988	500	1,500	91,469	470	93,939
1989	1,000	7,000	79,714	0	87,714
1990	500	3,000	49,587	0	53,087
1991	1,000	4,000	117,000 ^c	0	122,000
1992	300	3,500	89,791 ^c	0	93,591
1993	400	4,000	144,677 ^c	0	149,077
1994	500	8,500	50,527 ^c	0	59,527
1995	1,000	7,000	145,392 ^c	450	153,842
1996	1,000	9,000	200,000 ^c	441	210,441
1979-95 Average	622	3,169	68,112	234	72,137

^a Through 1990, "Commercial Harvest" and "Total Return" includes returns only to Leisure Lake in China Poot Bay; after 1990, these figures include combined returns to both Leisure Lake in China Poot Bay and Hazel Lake in Neptune Bay.

^b No data.

^c Portions of the commercial sockeye harvest in China Poot, Halibut Cove, and Tutka Bay Subdistricts were attributed to the Leisure and/or Hazel Lake returns.

Appendix Table 16. Commercial catch and escapement of sockeye salmon at Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 - 1996.

Return Year	Commercial Harvest	Escapement ^a	Total Return
1975	b	100	100
1976	b	900	900
1977	b	200	200
1978	b	100	100
1979	b	c	b
1980	b	3,500	3,500
1981	b	2,500	2,500
1982	b	8,000	8,000
1983	2,800	11,000	13,800
1984	16,500	13,000	29,500
1985	10,500	3,500	14,000
1986	111,000	7,000	118,000
1987	102,000	10,000	112,000
1988	164,200	9,000	173,200
1989	38,905	12,000	50,905
1990	70,347	17,000	87,347
1991	60,397	10,189	70,586
1992	13,793	9,269	23,062
1993	24,567	4,000	28,567
1994	0 ^d	808	808
1995	0 ^d	1,086	1,086
1996	0 ^d	2,990	2,990
Average Since 1985	49,642	7,623	57,265

^a Estimated from aerial surveys from 1975-1990, weir counts from 1991-1995.

^b Closed to fishing.

^c No data.

^d Due to low returns, the Chenik Subdistrict was closed to fishing for the entire season.

Appendix Table 17. Commercial coho salmon catch in numbers of fish by district, Lower Cook Inlet, 1976 - 1996^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1976	1,905	0	1,111	200	3,216
1977	1,255	78	105	360	1,798
1978	4,318	45	1,584	582	6,529
1979	10,846	135	1,116	296	12,393
1980	11,568	16	2,495	426	14,505
1981	7,976	485	1,845	470	10,776
1982	7,165	92	38,685	950	46,892
1983	3,433	54	7,138	594	11,219
1984	3,193	41	13,027	536	16,797
1985	4,258	3,210	2,024	835	10,327
1986	3,095	5,052	9,935	770	18,852
1987	2,163	2,481	8,079	1,631	14,354
1988	2,987	2	4,471	486	7,946
1989	6,667	72	4	5,346	12,089
1990	1,552	74	26	7,645	9,297
1991	9,415	12	2,337	7,283	19,047
1992	1,277	1	1,488	3,136	5,902
1993	4,431	119	3	8,924	13,477
1994	1,373	993	1,897	10,410	14,673
1995	5,161	1,272	6,084	5,192	17,709
1996	9,543	96	1	3,932	13,572
20-Year Avg.	4,702	712	5,173	2,804	13,390
1976-85 Avg.	5,592	416	6,913	525	13,445
1986-95 Avg.	3,812	1,008	3,432	5,082	13,335
1996 % of Total	70.31	0.71	0.01	28.97	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 18. Commercial pink salmon catch in numbers of fish by district, Lower Cook Inlet, 1976 - 1996^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1976	99,817	93	1,112	35,423	136,445
1977	157,025	1,129,250	6,308	1,349	1,293,932
1978	251,761	70,080	982	29,738	352,561
1979	986,909	1,945,536	58,484	0	2,990,929
1980	478,019	154,041	101,864	155,779	889,703
1981	1,453,982	1,714,115	66,097	44,989	3,279,183
1982	296,556	67,523	43,871	143,639	551,589
1983	690,254	199,794	1,405	36,154	927,607
1984	336,595	89,085	138,145	136,797	700,622
1985	518,889	618,222	194	92,403	1,229,708
1986	542,521	401,755	423,774	40,243	1,408,293
1987	90,522	23,890	72,684	14,333	201,429
1988	852,382	6,094	61,080	1,740	921,296
1989	987,488	52,677	256,669	92	1,296,926
1990	178,087	191,320	2,448	11,815	383,670
1991	253,962	359,664	47,833	167,250	828,709
1992	417,021	146	2,594	60,007	479,768
1993	692,794	159,159	4,205	10,616	866,774
1994	1,589,709	13,200	33	44,987	1,647,929
1995	2,475,312	192,098	169,054	12,000	2,848,464
1996	444,236	7,199	36	35	451,506
20-Year Avg.	667,480	369,387	72,942	51,968	1,161,777
1976-85 Avg.	526,981	598,774	41,846	67,627	1,235,228
1986-95 Avg.	807,980	140,000	104,037	36,308	1,088,326
1996 % of Total	98.39	1.59	0.01	0.01	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 19. Commercial pink salmon catch in thousands of fish by subdistrict during odd-numbered years, Lower Cook Inlet, 1959 - 1995^a.

Location	1959	1961	1963	1965	1967	1969	1971	1973	1975	1977
Humpy Creek	13.2	34.5	20.6	6.7	6.9	0.6	0	37.3	242.1	26.4
Halibut Cove and Lagoon		33.4	36.9	7.1	33.4	0	11.4	7.2	97.2	16.3
Tutka/Barabara	14.4	106.8	37.7	44.6	31.6	32.9	3.9	20.0	89.2	21.9
Seldovia Bay	4.9	15.1	1.6	19.2	11.7	28.8	27.4	19.4	429.6	47.6
Port Graham Bay	5.3	1.0	2.7	12.4	5.1	2.0	1.0	13.9	18.3	44.8
Dogfish Bay	1.6	0	0	0.1	2.3	0	10.4	0.3	0	5.0
Port Chatham	1.2	0	0.8	0	0	0	26.3	20.6	16.0	1.4
Windy Bay	3.1	2.2	0	5.4	0	0	57.3	68.5	18.1	173.2
Rocky Bay	2.3	0	1.4	0.1	0	0	0.1	0.2	0	11.6
Port Dick Bay	28.2	92.9	19.0	15.3	259.9	51.5	94.6	96.6	90.3	881.7
Nuka Bay	33.3	2.0	0.3	0	0.1	0	119.7	8.1	35.4	56.3
Resurrection Bay	8.4	0	0	0	1.2	0	0	0	0	0
Bruin Bay	0	0	12.3	0.9	2.1	0	11.7	0	0	6.2
Rocky/Ursus Coves	3.7	2.7	44.2	0	13.0	52.8	16.4	7.9	0	0
Iniskin/Cottonwood Bays	1.5	3.3	21.8	0	0.1	26.0	0	4.7	0	0.1
Miscellaneous	3.6	9.5	4.3	3.8	8.1	7.8	12.7	2.7	27.1	1.4
Total	124.7	303.4	203.6	115.6	375.5	202.4	392.9	307.4	1,063.3	1,293.9

Location	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997
Humpy Creek	277.0	239.9	8.1	5.6	0	91.4	0	0.2	13.7	
Halibut Cove and Lagoon	27.1	11.1	18.8	5.9	30.5	254.4	91.1	100.2	1.9	
China Poot ^b						8.5	135.7	50.6	12.9	
Tutka/Barabara	416.8	1,026.6	616.0	491.2	56.5	632.1	117.6	539.4	2,428.5	
Seldovia Bay	140.8	126.4	43.3	3.8	1.2	1.1	0.3	2.4	8.2	
Port Graham Bay	124.7	45.9	4.1	12.5	2.3	0	0	0	10.2	
Dogfish Bay	7.4	22.9	0.2	0	0	0	0	0	0	
Port Chatham	174.4	55.8	3.3	7.0	0	9.7	7.5	14.7	17.6	
Windy Bay	552.7	2.9	0	4.8	0	0	49.1	43.4	111.2	
Rocky Bay	122.2	16.5	1.3	0	0	0	0	0	27.5	
Port Dick Bay	964.8	1,140.9	140.0	455.6	3.0	0	289.7	26.6	0	
Nuka Bay	121.7	395.1	55.0	150.8	20.9	43.0	10.6	13.8	21.4	
Resurrection Bay	0	32.6	27.1	74.6	11.8	0	0	0.7	0	
Bruin Bay	40.3	51.9	0.3	0	1.2	202.8	45.1	0.1	104.8	
Rocky/Ursus Coves	14.4	14.1	0	0	69.4	53.8	0	0	58.0	
Iniskin/Cottonwood Bays	0.2	0	0.3	0	0.2	0	0	0	0	
Miscellaneous	6.4	16.6	9.8	17.9	4.4	0.1	82.0	74.7	32.6	
Total	2,990.9	3,199.2	927.6	1,229.7	201.4	1,296.9	828.7	866.8	2,848.5	

^a Data source: ADF&G fish ticket database.

^b China Poot Subdistrict, including Neptune Bay, was part of Halibut Cove Subdistrict prior to 1988.

Appendix Table 20. Commercial pink salmon catch in thousands of fish by subdistrict during even-numbered years, Lower Cook Inlet, 1960 - 1996^{a,b}.

Location	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978
Humpy Creek	51.0	73.9	53.5	24.6	2.6	85.2	1.7	33.3	3.3	16.3
Halibut Cove and Lagoon	20.7	35.5	28.9	16.0	41.3	28.9	0.4	2.2	69.8	27.8
Tutka/Barabara	87.6	279.5	100.9	53.5	26.9	43.9	5.2	5.5	18.0	167.9
Seldovia Bay	42.6	142.8	37.4	44.1	23.6	19.0	0.2	3.5	3.0	35.8
Port Graham Bay	7.1	18.1	38.4	5.1	23.0	19.6	1.1	4.5	3.9	4.0
Dogfish Bay	1.8	1.4	0.1	7.1	0	9.8	0.3	0	0	0.3
Port Chatham	15.7	102.2	67.1	6.7	10.0	1.9	0	0	0	0
Windy Bay	29.2	85.5	68.6	20.1	3.4	0.8	0	0	0	0
Rocky Bay	17.0	225.9	53.2	0	10.8	36.8	0	0	0	0
Port Dick Bay	257.4	1,118.3	526.3	296.8	55.0	336.5	0	0.6	0	63.6
Nuka Bay	26.6	129.8	23.8	0	90.2	48.4	0.3	0.7	0.1	6.3
Resurrection Bay	5.8	0.1	0.3	0	37.4	40.2	18.2	0	35.4	29.7
Bruin Bay	2.6	0	0	0	126.2	10.2	0	0	0	0
Rocky/Ursus Coves	6.6	3.2	13.5	2.9	18.0	7.5	0	0	0	0.1
Iniskin/Cottonwood Bays	2.1	3.2	4.3	0	9.9	3.5	0	0	0.1	0.1
Miscellaneous	37.8	28.9	39.1	102.3	107.1	14.0	1.3	0.3	2.8	0.7
Total	611.6	2,248.3	1,055.4	579.2	585.4	716.2	28.7	50.6	136.4	352.6

Location	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998
Humpy Creek	48.6	4.9	53.5	116.7	0	0	0	0	0	
Halibut Cove and Lagoon	4.7	1.0	10.9	14.0	106.8	91.0	58.4	105.6	2.3	
China Poot ^c					5.4	46.1	35.7	24.2	8.2	
Tutka/Barabara	312.5	184.9	262.0	400.2	723.9	37.4	320.9	1,454.5	428.2	
Seldovia Bay	81.7	70.3	2.2	2.8	5.5	3.6	1.9	5.4	4.1	
Port Graham Bay	30.5	35.4	8.0	8.8	10.7	0	0	0	1.5	
Dogfish Bay	4.7	1.7	0.1	0	0	0	0	0	0	
Port Chatham	1.8	12.6	0	0	0	22.1	0	0	0	
Windy Bay	0	0	0	0	0	0	0	0	0	
Rocky Bay	1.4	0	0	0	0	0	0	0	0	
Port Dick Bay	133.3	44.0	84.6	304.0	5.9	169.1	0.1	1.6	0	
Nuka Bay	12.8	8.7	4.4	97.8	0.2	0.2	0	11.6	7.2	
Resurrection Bay	155.8	137.4	122.3	36.5	0.5	0	0	T	T	
Bruin Bay	100.6	13.3	125.2	349.7	5.0	0.4	1.9	T	T	
Rocky/Ursus Coves	0	20.2	8.5	71.1	49.9	0	0.3	0	0	
Iniskin/Cottonwood Bays	0.1	0.4	0.4	0.2	1.3	0	T	0	0	
Miscellaneous	0.2	16.8	18.5	6.5	6.2	60.6	60.6	45.0	0	
Total	889.7	551.6	700.6	1,408.3	921.3	383.7	479.8	1,647.9	451.5	

^a Data source: ADF&G fish ticket database.

^b "T" denotes trace, less than 50 fish harvested.

^c China Poot Subdistrict, including Neptune Bay, was part of Halibut Cove Subdistrict prior to 1988.

Appendix Table 21. Commercial chum salmon catch in numbers of fish by district, Lower Cook Inlet, 1976 - 1996^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1976	1,517	412	48,848	45	50,822
1977	6,734	70,167	65,659	3,229	145,789
1978	5,525	19,224	48,669	100	73,518
1979	8,221	180,558	29,711	0	218,490
1980	4,605	32,246	35,921	720	73,492
1981	20,920	238,393	73,501	3,279	336,093
1982	18,466	63,075	108,946	7,698	198,185
1983	14,281	27,203	142,901	7,934	192,319
1984	8,065	3,204	70,736	10,535	92,540
1985	5,513	11,844	8,139	5,144	30,640
1986	5,560	11,701	61,670	3,757	82,688
1987	5,030	28,663	108,412	14,913	157,018
1988	7,742	71,202	218,299	24,668	321,911
1989	3,141	43	7,809	312	11,305
1990	2,433	614	3,597	307	6,951
1991	1,962	14,337	7,853	80	24,232
1992	1,885	181	20,051	86	22,203
1993	2,788	970	600	9	4,367
1994	2,631	32	14	2,792	5,469
1995	4,530	474	10,302	330	15,636
1996	3,511	3	27	223	3,764
20-Year Avg.	6,577	38,727	53,582	4,297	103,183
1976-85 Avg.	9,385	64,633	63,303	3,868	141,189
1986-95 Avg.	3,770	12,822	43,861	4,725	65,178
1996 % of Total	93.28	0.08	0.72	5.92	100.00

^a Data source: ADF&G fish ticket database.

Appendix Table 22. Commercial chum salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1976 - 1996^{a,b}.

Location	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Tutka Bay	0.1	2.4	1.8	2.9	2.4	5.6	1.1	3.9	4.0	1.3	0.7	1.6	0.5
Port Graham	2.3	1.8	0.5	4.0	3.8	2.1	0.9	5.3	3.0	2.3	1.3	4.8	2.0
Dogfish Bay	4.9	0.4	0.1	0	0.2	0	0	7.0	15.3	0.1	0	50.9	114.5
Port Chatham	1.0	2.5	0	2.8	4.3	5.2	0	17.8	0	1.0	0	0.1	2.4
Rocky/Windy Bays	14.9	6.4	2.2	8.5	0.3	33.8	8.1	1.7	0	0.5	0	39.4	1.4
Port Dick	42.4	51.0	36.8	112.0	110.8	227.4	14.2	60.9	36.0	10.9	5.4	41.2	0.7
Nuka Bay	1.7	8.4	1.7	0.5	1.5	0	0	0	1.5	6.9	0	5.9	0.1
Resurrection Bay	0.1	0.5	0	0	0	0	0	0	0.1	0.7	0	0.6	0.4
Douglas River	0.2	0	0	0	0	0	0	0	0	0	0	0	0
Kamishak River	0	0	0	0	0	0	0	0	0	3.7	0.4	0	0
McNeil River	0	0.4	0	0	0	2.7	0.90	0	0.4	8.3	4.4	1.9	0
Bruin Bay	0	0.3	0.5	0	0.1	0	0.4	0	1.0	7.5	0	12.8	1.6
Ursus/Rocky Coves	8.5	8.6	1.8	1.1	2.8	1.2	0	4.0	2.9	1.0	3.6	8.9	10.3
Cottonwood/Iniskin	12.1	33.4	10.2	41.7	10.9	10.9	0	0	19.0	25.5	44.4	71.9	14.5
Miscellaneous	22.6	0	0	5.8	1.4	1.4	2.5	28.5	2.2	5.4	1.0	2.4	0.2
Totals	110.8	116.1	55.6	179.3	138.5	323.3	28.1	129.1	85.4	75.1	61.2	242.4	148.6

Location	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Tutka Bay	1.3	0.8	1.4	2.0	0.9	0.8	2.6	2.7	1.8	7.9	8.3	9.9	3.4
Port Graham	3.2	2.6	1.0	2.2	0.5	5.0	2.4	4.3	2.5	11.2	7.4	1.7	3.6
Dogfish Bay	41.1	0.4	0	0	0	9.4	0	8.5	2.1	71.8	15.6	2.8	1.1
Port Chatham	0	0.4	0	0.6	0	0.1	0	1.7	1.3	59.6	16.2	2.1	0
Rocky/Windy Bays	0	0.9	0	0.3	0	17.7	0	76.7	2.1	7.4	0	3.2	0
Port Dick	0	33.4	8.1	6.8	0	25.6	10.3	79.0	19.0	85.8	30.3	18.0	1.9
Nuka Bay	2.3	40.8	3.9	3.6	0.4	17.4	0.4	14.7	7.8	3.8	0.9	0.8	0.2
Resurrection Bay	0.7	0	0	0	0	0	0.1	0	0.7	2.4	7.7	6.9	3.0
Douglas River	0	0	0	0.1	7.1	4.0	2.9	0.7	10.1	46.7	37.1	27.2	9.2
Kamishak River	2.4	0	1.8	0	10.5	0	23.9	17.8	2.8	8.6	9.2	23.9	16.2
McNeil River	2.3	0	2.0	0	16.9	38.5	4.9	6.5	6.3	11.6	32.6	67.9	12.0
Bruin Bay	1.8	0	0.7	0	0	0	0	4.0	11.0	1.7	1.3	2.6	5.9
Ursus/Rocky Coves	0.2	5.7	0	2.0	2.8	7.8	1.9	0.5	0.3	1.5	13.5	0	3.7
Cottonwood/Iniskin	19.7	29.9	0	2.8	11.5	15.3	14.9	0.2	5.4	3.5	21.6	21.4	23.0
Miscellaneous	0.5	0.6	0.3	1.2	0.2	4.2	9.2	1.2	0.4	2.6	3.5	3.9	9.3
Totals	75.5	115.5	19.2	21.6	50.8	145.8	73.5	218.5	73.5	336.1	198.0	192.3	92.5

Location	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Tutka Bay	3.2	3.9	3.9	4.7	2.5	1.5	0.8	0.6	0.9	0.8	1.6	1.0	
Port Graham	1.3	0.8	0.4	1.2	0	0	0	0	0	0	0.7	0.7	
Dogfish Bay	0	0	0	0	0	0	0	0	0	0	0	0	
Port Chatham	1.3	0	0	0	0	0.1	0.1	0	0.1	0	T	0	
Rocky/Windy Bays	0	0	0	0	0	0	0.5	0	0.1	0	0.4	0	
Port Dick	9.6	10.4	27.1	64.4	0	0.5	13.7	0.2	0.7	T	0	0	
Nuka Bay	0.8	1.3	1.6	6.8	0	T	T	0	T	T	0.1	T	
Resurrection Bay	3.0	3.5	13.9	23.9	0	0	0	0	0	2.5	0.3	0.2	
Douglas River	8.0	11.6	23.7	24.8	0	0.1	3.0	12.5	T	T	0.7	0	
Kamishak River	0.1	0.1	24.6	26.7	0	T	0.7	1.5	0	0	0.1	0	
McNeil River	0	13.7	32.9	104.0	0.1	0.1	0.1	2.0	0.4	0	0	0	
Bruin Bay	0	5.4	0.1	2.8	4.4	0.1	2.6	0.8	T	0	4.9	T	
Ursus/Rocky Coves	0	22.1	17.2	20.7	3.4	0	0	2.7	0	0	2.2	0	
Cottonwood/Iniskin	0	8.8	9.7	39.2	0	0	1.0	0.2	0	0	2.3	0	
Miscellaneous	3.3	1.1	1.9	2.7	0.9	4.7	1.7	1.6	2.1	2.1	2.3	1.9	
Totals	30.6	82.7	157.0	321.9	11.3	7.0	24.2	22.2	4.4	5.5	15.6	3.8	

^a Data source: ADF&G fish ticket database.

^b "T" denotes trace, less than 50 fish harvested.

Appendix Table 23. Estimated sockeye salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1976 - 1996^a.

Year	English Bay	Delight Lake	Desire Lake	Bear Lake ^{b,c}	Aialik Lake	Mikfik Lake	Chenik Lake	Amakd. Creek	Kamish. Rivers	Douglas River	Total
1976	6.0	6.0	11.0	0.6	8.0	10.0	0.9	1.6	---	0.2	44.3
1977	12.5	5.2	10.7	0.0	5.0	9.8	0.2	2.6	---	2.6	48.6
1978	13.5	8.0	10.0	0.0	3.0	12.0	0.1	2.6	---		49.2
1979	4.4	8.0	12.0	0.0	5.0	6.0	0.0	1.0			36.4
1980	12.0	10.0	17.0	1.5	6.6	6.5	3.5	2.6	---	0.4	60.1
1981	10.5	7.3	12.0	0.7	1.8	5.3	2.5	1.9	---	0.2	42.2
1982	20.0	25.0	18.0	0.5	22.4	35.0	8.0	3.2	1.0	4.2	137.3
1983	12.0	7.0	12.0	0.7	20.0	7.0	11.0	1.2	0.4	0.5	71.8
1984	11.1	10.5	15.0	0.5	22.0	6.0	13.0	1.4	0.1	0.0	79.6
1985	5.0	26.0	18.0	1.1	8.0	20.0	3.5	0.9	0.8	0.0	83.3
1986	2.8	13.0	10.0	0.8	7.6	7.8	7.0	1.9	5.0	0.2	56.1
1987	7.0	10.5	13.4	0.3	9.2	9.0	10.0	1.1	---	0.1	60.6
1988	2.5	1.2	9.0	0.1	13.0	10.1	9.0	0.4	0.5	0.0	45.8
1989	4.5	7.7	9.0	0.1	6.5	11.5	12.0 ^c	1.2	0.5	0.6	53.6
1990	3.3	5.2	9.5	0.1	5.7	8.8	17.0	1.8	0.2	0.6	52.2
1991	7.0	4.1	8.2	0.7	3.7	9.7	10.2 ^c	1.9	0.7		46.2
1992	6.4	5.9	11.9	1.9	2.5	7.8	9.3 ^c	1.9	4.9	0.2	52.7
1993	8.9	5.6	11.0	5.0	3.0	6.4	4.0 ^c	2.0	4.1	---	50.0
1994	13.8 ^c	5.6	10.5	8.6	7.3	9.5	0.8 ^c	0.8	^d	---	56.9
1995	22.5 ^c	15.8	15.8	8.3	2.6	10.1	1.1 ^c	2.4	^d	---	78.6
1996	12.4 ^c	7.7	9.4	8.0	3.5	10.5	3.0 ^c	2.9	1.8	0.6	55.8
<hr/>											
20-Year											
Average	9.3	9.4	12.2	1.6	8.1	10.4	6.2	1.7	1.7	0.7	61.3
<hr/>											
1976-85											
Average	10.7	11.3	13.6	0.6	10.2	11.8	4.3	1.9	0.6	1.0	66.0
<hr/>											
1986-95											
Average	7.9	7.5	10.8	2.6	6.1	9.1	8.0	1.5	2.3	0.3	56.1
<hr/>											
Esc.											
Goal	10-20	10	10	1	2.5-5	5-7	10	1	•	•	51-66

^a Unless otherwise noted, estimated escapements are either peak aerial survey counts or adjusted aerial survey counts based on survey conditions and time of surveys.

^b Limited by Bear Lake Management Plan since 1971.

^c Weir counts.

^d Insufficient survey data to generate escapement information.

Appendix Table 24. Estimated pink salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1960 - 1996^a.

Location	Y E A R										
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Humpy Creek	10.0	22.6	56.0	34.7	18.5	28.0	30.0	25.0	24.7	5.4	55.2
China Poot Creek	9.0	2.0	26.0	---	---	---	---	2.5	6.0	0.2	1.5
Tutka Lagoon Creek	15.0	15.0	30.0	10.0	20.0	20.0	12.0	7.0	7.9	6.5	6.5
Barabara Creek	2.0	0.1	1.5	0.1	---	---	5.0	---	2.0	0.9	0.4
Seldovia River	25.0	25.0	50.0	13.0	60.0	30.0	86.0	55.0	53.2	60.0	23.0
Port Graham River	15.0	5.0	50.0	2.0	16.0	1.5	24.0	2.0	24.4	4.0	16.6
Dogfish Lagoon	2.0	---	3.0	---	---	---	---	---	---	---	---
Port Chatham Creeks	4.0	7.0	7.0	---	---	---	10.0	---	---	---	3.0
Windy Right Creek	8.0	10.0	12.5	4.9	6.2	2.0	7.0	6.0	2.8	3.2	2.1
Windy Left Creek	8.0	5.0	12.5	4.5	7.7	10.0	7.0	6.0	6.9	23.0	13.0
Rocky River	130.0	2.0	200.0	12.0	80.0	0.3	44.0	1.0	43.1	1.0	32.0
Port Dick Creek	35.0	14.0	40.0	16.0	31.5	50.0	35.0	20.0	29.0	12.0	34.5
Island Creek	23.2	2.0	15.0	3.6	30.0	0.5	7.0	0.5	4.3	0.1	5.5
South Nuka Island Creek	20.0	2.0	22.0	0.1	10.0	---	10.0	---	10.0	3.0	11.0
Desire Lake Creek	---	---	18.0	---	1.3	---	---	---	---	---	---
James Lagoon	---	---	---	---	---	---	---	---	---	---	---
Aialik Lagoon	---	---	25.0	0.3	---	---	2.0	---	---	---	---
Bear Creek	1.4	---	3.1	---	6.4	---	---	---	3.1	---	---
Salmon Creek	---	---	---	---	---	---	---	---	---	---	---
Thumb Cove	---	---	---	---	---	---	---	---	---	---	---
Humpy Cove	---	---	---	---	---	---	---	---	---	---	---
Tonsina Creek	---	---	---	---	---	---	---	---	2.9	0.1	---
Big Kamishak River	---	---	100.0	75.0	75.0	---	13.0	---	---	---	---
Little Kamishak River	---	---	100.0	24.0	---	---	28.0	3.5	---	0.5	2.0
Amakdedori Creek	60.0	---	80.0	---	10.0	---	8.0	---	---	1.0	13.0
Bruin Bay River	18.0	---	300.0	25.0	---	---	20.0	0.5	---	5.0	40.0
Sunday Creek	1.5	---	5.0	2.0	---	---	20.0	---	---	1.0	2.0
Brown's Peak Creek	---	---	25.0	10.0	20.0	10.0	11.0	---	---	2.0	---
Totals	387.1	111.7	1,181.6	237.2	392.6	152.3	379.0	129.0	220.3	128.9	261.3

-continued-

Appendix Table 24. (page 2 of 4)

Location	Y E A R										
	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Humpy Creek	45.0	13.8	36.9	17.4	64.0	27.2	86.0	46.1	200.0	64.4	115.0
China Poot Creek	2.1	1.0	6.0	5.2	21.6	2.0	3.9	11.2	20.6	12.3	5.0
Tutka Lagoon Creek	16.7	1.5	6.5	2.6	17.6	11.5	14.0	15.0	10.6	17.3	21.1
Barabara Creek	4.0	0.6	---	0.2	22.7	0.2	5.7	1.4	10.0	5.8	16.8
Seldovia River	31.1	5.8	14.5	13.7	36.2	25.6	35.7	24.6	43.7	65.5	62.7
Port Graham River	13.2	2.4	7.0	2.8	27.3	6.5	20.6	6.7	32.7	40.2	18.4
Dogfish Lagoon	0.3	---	1.0	---	2.3	---	8.1	0.6	7.3	0.3	2.6
Port Chatham Creeks	15.5	1.0	5.0	0.2	7.7	---	14.2	0.3	20.8	7.7	11.2
Windy Right Creek	13.0	0.1	4.6	0.1	18.7	0.2	11.1	0.3	10.4	3.3	4.7
Windy Left Creek	35.4	0.4	12.9	0.1	9.7	0.2	47.3	1.1	74.8	10.9	31.3
Rocky River	1.6	8.2	2.0	1.5	4.4	2.7	36.7	8.2	85.0	6.4	25.0
Port Dick Creek	97.8	10.0	26.4	1.5	62.8	12.7	109.3	44.9	116.0	56.1	106.0
Island Creek	0.1	1.7	0.5	0.5	0.1	---	0.6	0.4	0.6	2.2	25.0
South Nuka Island Creek	14.0	0.3	16.0	---	28.0	---	12.0	---	15.0	0.3	16.0
Desire Lake Creek	30.0	0.3	3.0	---	0.4	0.6	0.8	1.0	3.0	16.0	5.0
James Lagoon	---	---	---	---	---	---	---	---	---	4.6	14.0
Aialik Lagoon	---	---	---	0.1	---	0.4	---	---	---	---	---
Bear Creek	---	0.5	---	4.9	---	10.0	---	7.8	---	13.3	0.4
Salmon Creek	---	---	---	---	---	16.9	---	11.0	---	15.5	0.1
Thumb Cove	---	---	---	1.1	---	2.0	---	2.0	---	1.2	1.0
Humpy Cove	---	---	---	0.6	---	1.4	---	0.9	---	5.7	0.4
Tonsina Creek	---	---	---	1.4	---	5.7	---	1.5	---	0.7	0.2
Big Kamishak River	---	---	15.0	1.0	---	8.0	---	12.0	10.0	2.0	---
Little Kamishak River	---	---	13.0	---	---	6.0	---	0.4	3.5	0.6	---
Amakdedon Creek	---	0.2	3.0	1.0	5.0	---	---	0.9	6.0	3.8	1.5
Bruin Bay River	22.0	2.5	2.0	0.6	20.0	13.5	60.0	33.0	200.0	400.0	95.0
Sunday Creek	43.0	2.0	5.0	0.1	20.0	0.3	9.0	0.2	12.0	5.2	14.2
Brown's Peak Creak	8.0	1.2	3.2	0.1	10.0	1.2	13.0	0.9	15.0	2.3	17.7
Totals	392.8	53.5	183.5	56.7	378.5	154.8	488.0	232.4	897.0	763.6	610.3

-continued-

Appendix Table 24. (page 3 of 4)

Location	Y E A R										
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Humpy Creek	31.9	104.0	84.2	117.0	49.7	26.6	21.4	93.0	27.0	17.4	14.9
China Poot Creek	3.1	14.1	8.4	1.9	11.5	3.1	3.9	8.5	4.2	2.6	4.1
Tutka Lagoon Creek	18.5	12.9	10.5	14.0	13.4	4.8	11.2	11.9	38.5	16.8	26.7
Barabara Creek	2.1	14.8	1.0	1.6	1.8	0.3	0.7	4.5	3.9	10.9	2.2
Seldovia River	38.4	27.9	14.2	22.8	28.2	7.6	16.9	26.2	27.8	30.0	14.7
Port Graham River	28.9	4.6	10.9	26.3	17.5	3.8	7.9	19.1	20.1	29.0	5.4
Dogfish Lagoon	2.6	1.0	0.6	0.2	0.4	1.2	0.3	0.2	7.1	9.3	^c
Port Chatham Creeks	2.0	3.5	7.8	8.9	11.5	10.2	21.0	31.7	27.8	23.8	4.3
Windy Right Creek	4.7	4.3	3.4	5.4	2.5	2.0	1.3	6.6	7.1	20.7	3.9
Windy Left Creek	4.4	11.9	2.5	8.9	2.2	5.6	3.4	25.2	7.5	34.5	8.2
Rocky River	6.6	16.6	9.0	12.1	12.0	4.5	5.4	10.3	18.0	26.1	25.4
Port Dick Creek	19.9	64.1	44.6	65.3	41.6	4.5	12.0	55.4	41.7	54.2	6.9
Island Creek	15.0	15.3	35.0	27.9	16.6	0.1	7.2	6.7	25.0	24.4	12.5
South Nuka Island Creek	0.4	22.2	0.6	3.6	7.0	2.8	1.2	7.3	13.3	16.4	6.1
Desire Lake Creek	12.0	8.5	23.0	62.5	32.0	11.0	2.5	47.0	1.0	1.3	0.4
James Lagoon	6.0	5.1	4.0	9.0	6.6	1.1	1.7	4.9	3.8	4.4	0.4
Aialik Lagoon	5.0	3.0	4.0	9.4	6.0	1.5	0.7	0.8	---	---	^c
Bear Creek	7.9	0.8	7.7	4.1	14.0	3.5	0.2	1.7	4.4	15.4b	2.3
Salmon Creek	21.0	0.5	10.2	2.1	8.3	1.7	0.1	1.6	---	^b	5.3
Thumb Cove	7.9	4.9	4.2	14.5	4.0	2.7	0.3	4.2	---	3.4	0.4
Humpy Cove	4.0	2.0	2.5	5.0	0.9	0.3	0.4	1.0	3.8	---	^c
Tonsina Creek	7.5	5.4	6.0	48.2	11.2	3.4	0.1	0.5	1.2	0.3	^c
Big Kamishak River	5.0	---	---	---	5.0	---	1.0	---	---	---	^c
Little Kamishak River	2.2	---	0.1	1.6	2.0	---	0.5	---	---	0.9	^c
Amakdedori Creek	6.3	0.2	---	1.0	6.0	0.4	1.0	2.0	0.1	0.7	3.2
Bruin Bay River	75.0	4.0	110.0	3.5	1,200.0	24.0	29.0	350.0	19.0	74.9	3.2
Sunday Creek	12.0	4.7	12.0	11.4	109.0	29.7	18.0	103.0	2.8	20.9	2.9
Brown's Peak Creak	3.5	1.7	6.8	7.0	28.0	40.2	17.0	120.0	1.0	16.7	5.0
Totals	353.8	358.0	423.2	495.2	1,648.9	196.6	186.3	943.3	306.1	455.0	158.4

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Appendix Table 24. (page 4 of 4)

Location	Y E A R								1960-95 Average	Escapement Goal
	1993	1994	1995	1996	1997	1998	1999	2000		
Humpy Creek	36.0	14.1	89.3	9.0					48.7	25-50
China Poot Creek	1.6	5.7	2.0	2.8					6.7	5
Tutka Lagoon Creek	27.4	14.5	15.9	3.5					14.5	6-10
Barabara Creek	11.9	4.5	10.8	2.4					4.7	18-24
Seldovia River	43.4	24.4	48.5	17.8					33.6	25-35
Port Graham River	12.8	7.6	10.0	7.0					15.1	20-40
Dogfish Lagoon	0.3	1.3	13.3	2.3					2.8	-
Port Chatham Creeks	22.2	3.3	14.0	8.6					10.6	10-15
Windy Right Creek	13.6	2.2	11.4	9.9					6.1	10
Windy Left Creek	25.9	3.0	31.6	2.5					14.0	30-50
Rocky River	70.0	17.1	56.3	80.1					28.2	50
Port Dick Creek	37.0	18.1	6.6	23.2					39.8	20-100
Island Creek	12.1	28.3	10.6	40.1					10.3	12-18
South Nuka Island Creek	34.3	1.4	6.2	6.8					10.1	10
Desire Lake Creek	19.3	---	---	---					12.5	10-20
James Lagoon	3.3	0.8	0.6	---					4.4	5-10
Aialik Lagoon	---	---	1.1	---					4.2	5
Bear Creek	6.6 ^b	34.8 ^b	38.6 ^b	8.0 ^b					8.0	5
Salmon Creek	^b	^b	^b	^b					7.3	10
Thumb Cove	5.5	10.8	9.3	9.5					4.4	4
Humpy Cove	0.9	2.2	1.8	3.4					2.0	2
Tonsina Creek	3.2	7.0	0.5	0.4					5.4	5
Big Kamishak River	---	---	---	16.7					24.8	20
Little Kamishak River	---	---	---	---					11.1	20
Amakdedori Creek	1.7	0.7	4.5	---					8.2	5
Bruin Bay River	86.4	5.9	307.3	27.5					110.9	25-50
Sunday Creek	57.8	3.1	95.9	2.8					20.2	10
Brown's Peak Creek	41.6	1.3	96.7	2.4					17.3	10
Totals	574.8	212.1	882.8	286.7					416.3	377-593

^a Escapement estimates are derived from periodic ground surveys with stream life factors applied, or from periodic aerial surveys. Aerial survey estimates after 1990 incorporate stream life factors; prior to 1990, aerial estimates are peak aerial survey counts adjusted for survey conditions and time of surveys.

^b Escapement figure for Bear Creek represents the combined escapement for Bear and Salmon Creeks.

^c Insufficient data for escapement estimates.

Appendix Table 25. Estimated chum salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1976 - 1996^a.

Year	Port Graham	Dogfish Lagoon	Rocky River	Pt. Dick Head	Island Creek	Big Kamishak	Little Kamishak	McNeil River	Bruin Bay	Ursus Cove	Cotton- wood	Iniskin Bay	Total
1976	0.4	3.0	12.0	1.5	1.0	24.0	21.0	10.0	4.0	6.0	5.0	13.5	101.4
1977	5.2	6.4	10.5	5.0	11.1	---	---	20.0	18.0	9.3	10.0	4.4	99.9
1978	4.8	9.3	6.3	8.9	16.9	23.0	30.0	45.0	4.0	9.7	12.5	11.4	181.8
1979	2.2	8.2	35.0	4.0	16.8	15.0	15.0	8.0	15.0	5.0	2.5	4.0	130.7
1980	1.1	4.0	23.0	4.2	10.9	10.0	13.0	8.0	15.0	8.0	4.2	9.3	110.7
1981	4.8	11.5	12.5	4.1	17.5	11.0	6.0	30.0	10.0	10.0	9.0	9.0	135.4
1982	2.5	8.5	2.8	1.7	8.7	25.0	18.0	25.0	10.0	9.0	7.0	12.8	131.0
1983	1.9	5.3	4.0	4.5	36.2	25.0	25.0	48.0	5.5	7.7	8.3	12.0	183.4
1984	2.1	8.6	3.5	2.7	25.6	19.0	12.0	21.0	8.0	7.0	6.5	9.8	125.8
1985	0.5	4.9	2.5	1.0	9.1	6.0	4.5	9.5	2.0	3.0	3.0	5.0	51.0
1986	0.6	2.5	2.0	1.7	8.6	24.0	17.0	22.0	2.0	11.0	11.0	5.9	108.3
1987	1.5	2.0	0.2	6.1	13.2	12.0	18.0	26.0	10.0	9.9	17.0	9.1	125.0
1988	3.0	8.6	0.3	9.0	7.8	15.0	13.0	49.0	7.0	9.4	16.0	9.5	147.6
1989	1.3	1.8	1.2	3.3	4.8	30.0	12.0	34.0	8.0	6.3	8.0	5.9	116.6
1990	2.6	1.0	0.8	1.1	2.3	2.5	7.9	8.0	4.0	3.8	4.3	8.4	46.7
1991	1.1	3.1		7.4	17.3	8.7	8.4	10.0	6.0	1.3	7.7	8.3	79.3
1992	1.4	0.8	1.7	5.4	6.7	4.5	7.1	19.2	8.5	1.7	6.1	3.4	66.5
1993	2.5	5.4	0.1	2.5	3.6	9.1	6.3	17.4	6.0	7.7	12.0	8.0	78.8
1994	5.2	11.3	1.9	3.5	8.8	---	9.0	15.0	6.1	6.2	10.2	18.9	96.1
1995	3.8	4.2	5.1	3.3	7.7	^b	^b	14.4	6.6	11.1	12.0	22.7	90.9
1996	3.7	6.7	2.0	2.3	6.9	11.1	4.4	16.1	14.9	7.6	16.1	7.8	99.6
20-Year Avg.	2.4	5.5	6.6	4.0	11.7	15.5	13.5	22.0	7.8	7.2	8.6	9.6	114.4
1976- 95 Avg.	2.6	7.0	11.2	3.8	15.4	17.6	16.1	22.5	9.2	7.5	6.8	9.1	128.5
1986- 95 Avg.	2.3	4.1	1.5	4.3	8.1	13.2	11.0	21.5	6.4	6.8	10.4	10.0	99.6
Esc. goal	4-8	5-10	20	4	10-15	20	20	20-40	5-10	5-10	10	10	133-177

^a Escapement estimates are derived from periodic ground surveys with stream life factors applied, or from periodic aerial surveys. Aerial survey estimates after 1990 incorporate stream life factors; prior to 1990, aerial estimates are peak aerial survey counts adjusted for survey conditions and time of surveys.

^b Insufficient data to generate escapement estimates.

Appendix Table 26. Personal use/subsistence set gillnet salmon catch in numbers of fish by species and effort, Southern District, Lower Cook Inlet, 1969 - 1996^a.

Year	Permits Issued	Permits Returned		Permits		Total			Catch			
		Number	%	Did Fish	Not Fished	Chinook	Sockeye	Coho	Pink	Chum	Other	Total
1969	47	44	93.6	35	9	0	9	752	38	0	17	816
1970	78	73	93.6	55	18	0	12	1,179	143	13	39	1,386
1971	112	95	84.8	53	42	2	16	1,549	44	7	20	1,638
1972	135	105	77.8	64	41	1	11	975	48	69	19	1,123
1973	143	128	89.5	82	46	0	18	1,304	84	40	9	1,455
1974	148	118	79.7	52	66	0	16	376	43	77	27	539
1975	292	276	94.5	221	55	4	47	1,960	632	61	95	2,799
1976	242	221	91.3	138	83	16	46	1,962	1,513	56	75	3,668
1977	197	179	90.9	137	42	12	46	2,216	639	119	84	3,116
1978	311	264	84.9	151	113	4	35	2,482	595	34	89	3,239
1979	437	401	91.8	238	163	6	37	2,118	2,251	41	130	4,583
1980	533	494	92.7	299	195	43	32	3,491	1,021	25	153 ^b	4,765
1981	384	374	97.4	274	100	25	64	4,314	732	89	100	5,324
1982	395	378	95.7	307	71	39	46	7,303	955	123	8	8,474
1983	360	328	91.1	210	118	4	21	2,525	330	40	2	2,922
1984	390	346	88.7	219	127	4	25	3,666	821	87	25	4,628
1985	316	302	95.6	205	97	5	43	3,372	166	35	3	3,624
1986	338	310	91.7	247	63	7	68	3,831	3,132	56	0	7,094
1987	361	338	93.6	249	89	5	50	3,977	279	61	0	4,372
1988	438	404	92.2	287	117	14	60	4,877	1,422	75	0	6,448
1989	466	452	97.0	332	120	41	156	7,215	882	53	49	8,396
1990	578	543	93.9	420	123	12	200	8,323	1,846	69	0	10,450
1991	472	459	97.2	295	164	8	47	4,931	366	23	0	5,375
1992	365	350	95.9	239	111	5	63	2,277	643	21	0	3,009
1993	326	317	97.2	215	102	6	44	1,992	463	18	0	2,523
1994	286	284	99.3	224	60	66	80	4,097	1,178	18	0	5,439
1995	235	232	98.7	178	54	118	108	2,916	343	7	0	3,492
1996	299	293	98.0	213	80	302	102	3,347	1,022	24	0	4,797
69-95												
Avg.	311	289	93.2	201	88	17	52	3,184	763	49	35	4,100

^a Figures after 1991 include information from both returned permits and inseason oral reports.

^b Steelhead trout (*Onchorhynchus mykiss*).

Appendix Table 27. Summary of personal use/subsistence salmon gillnet fishermen in the Southern District of Lower Cook Inlet (excluding the Port Graham/Nanwalek subsistence fishery) by area of residence, 1976 - 1996.

Year	Homer/ Fritz Cr.		Anchorage Area ^a		Halibut Cove		Anchor Pt. Ninilchik		Seldovia		Pt. Graham/ Nanwalek		Kenai/ Soldotna		Other		Total Permits Issued
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1976	182	70.0	24	9.2	9	3.5	25	9.6	5	1.9	4	1.5	6	2.3	5	1.9	260
1977	153	77.3	8	4.0	8	4.0	17	8.6	7	3.5	0	0.0	2	1.0	3	1.5	198
1978	214	68.8	40	12.9	5	1.6	30	9.6	12	3.9	3	1.0	4	1.3	3	1.0	311
1979	276	62.7	67	15.2	2	0.5	61	13.9	3	0.7	0	0.0	11	2.5	20	4.5	440
1980	310	57.9	81	15.1	0	0.0	80	15.0	7	1.3	0	0.0	42	7.9	13	2.4	535
1981	274	71.4	43	11.2	8	2.1	37	9.6	3	0.8	1	0.3	14	3.6	4	1.0	384
1982	295	74.7	19	4.8	9	2.3	44	11.1	0	0.0	0	0.0	7	1.8	21	5.3	395
1983	267	77.8	24	7.0	3	0.9	33	9.6	8	2.3	0	0.0	0	0.0	8	2.3	343
1984	266	72.1	20	5.4	6	1.6	62	16.8	5	1.4	1	0.3	5	1.4	4	1.1	369
1985	251	79.4	15	4.7	6	1.9	33	10.4	6	1.9	0	0.0	2	0.6	3	0.9	316
1986	280	82.8	18	5.3	4	1.2	29	8.6	1	0.3	0	0.0	1	0.3	5	1.5	338
1987	284	78.7	25	6.9	3	0.8	37	10.2	7	1.9	0	0.0	2	0.6	3	0.8	361
1988	338	77.2	36	8.2	5	1.1	43	9.8	6	1.4	0	0.0	10	2.3	0	0.0	438
1989	348	74.7	36	7.7	5	1.1	51	10.9	8	1.7	0	0.0	6	1.3	12	2.6	466
1990	441	76.3	36	6.2	5	0.9	65	11.2	12	2.1	0	0.0	6	1.0	13	2.2	578
1991	384	81.4	27	5.7	8	1.7	41	8.7	6	1.3	0	0.0	4	0.8	2	0.4	472
1992	302	82.7	21	5.8	5	1.4	32	8.8	3	0.8	0	0.0	1	0.3	1	0.3	365
1993	242	74.2	25	7.7	5	1.5	44	13.5	3	0.9	0	0.0	5	1.5	2	0.6	326
1994	235	82.2	20	7.0	4	1.4	21	7.3	1	0.3	0	0.0	1	0.3	4	1.4	286
1995	191	81.3	15	6.4	7	3.0	20	8.5	1	0.4	0	0.0	0	0.0	1	0.4	235
1996	241	80.6	16	5.4	7	2.3	26	8.7	3	1.0	1	0.3	2	0.7	3	1.0	299
20-Year Avg.	277	74.6	30	8.1	5	1.4	40	10.9	5	1.4	0	0.1	6	1.7	6	1.7	371
1976-85 Avg.	249	70.1	34	9.6	6	1.6	42	11.9	6	1.6	1	0.3	9	2.6	8	2.4	355
1986-95 Avg.	305	78.8	26	6.7	5	1.3	38	9.9	5	1.2	0	0.0	4	0.9	4	1.1	387

^a After 1989, "Anchorage Area" includes Mat-Su Valley, Eagle River, Chugiak, and or Fort Richardson.

Appendix Table 28. Subsistence salmon catch in numbers of fish by species for the village of Port Graham, Lower Cook Inlet, 1981 - 1996^a.

Year	SALMON HARVEST					Total	Households Reporting ^b
	Chinook	Sockeye	Coho	Pink	Chum		
1981 ^c	116	1,694	625	298	150	2,883	47
1982 ^b	98	798	508	851	193	2,448	38
1983 ^d	57	1,066	440	169	65	1,797	31
1984 ^c	21	2,095	166	215	6	2,503	34
1985 ^c	156	469	190	42	22	879	^e
1986 ^b	118	279	179	234	13	823	36
1987 ^f	21	186	574	264	69	1,114	31
1988 ^g	90	380	447	577	88	1,582	31
1989	48	94	555	524	46	1,267	32
1990	180	472	811	1,107	68	2,638	31
1991	178	61	355	1,454	173	2,221	32
1992 ^b	127	100	449	707	167	1,550	^e
1993 ^b	248	153	396	978	130	1,905	27
1994 ^b	267	246	872	858	452	2,695	43
1995 ^b	441	398	345	679	364	2,227	49 ^h
1996 ^b	251	669	373	267	227	1,787	45
1981-95 Average	144	566	461	597	134	1,902	27

^a Data source: ADF&G, Subsistence Division, data files.

^b Prior to 1995, figures represent only the single highest monthly total of households that *actually fished* over the course of the season; beginning in 1995, figures represent the total number of different households reporting over the course of the entire season, even if they did not fish.

^c Data include both subsistence set gillnet and rod/reel/handline harvest.

^d Data include only subsistence set gillnet harvest.

^e No data.

^f 46% set gillnet harvest, 54% rod/reel harvest.

^g 51% set gillnet harvest, 49% rod/reel harvest.

^h Salmon totals and households include 3 reports from non-residents of Port Graham village.

Appendix Table 29. Subsistence salmon catch in numbers of fish by species for the village of Nanwalek (formerly English Bay), Lower Cook Inlet, 1981 - 1996^a.

Year	SALMON HARVEST						Households Reporting ^b
	Chinook	Sockeye	Coho	Pink	Chum	Total	
1981 ^c	24	1,075	314	621	19	2,053	29
1982 ^b	13	1,584	1,305	1,850	36	4,788	31
1983 ^d	0	1,784	367	363	10	2,524	28
1984 ^c	18	1,225	385	404	0	2,032	26
1985 ^c	5	696	530	313	2	1,546	^e
1986 ^b	4	378	296	825	2	1,505	21
1987 ^f	2	626	322	476	45	1,471	21
1988 ^g	8	609	385	1,185	35	2,222	26
1989	0	60	651	868	0	1,579	29
1990	46	636	616	1,968	49	3,315	30
1991	4	574	1,508	3,087	46	5,219	35
1992 ^b	72	430	570	519	59	1,650	^e
1993 ^b	24	1,018	570	1,703	115	3,430	21
1994 ^b	29	642	512	1,127	49	2,359	25
1995 ^b	77	1,126	150	431	0	1,784	29
1996 ^b	55	1,054	560	437	25	2,131	25
1981-95 Average	22	831	565	1,049	31	2,498	27

^a Data source: ADF&G, Subsistence Division, data files.

^b Prior to 1995, figures represent only the single highest monthly total of households that *actually fished* over the course of the season; beginning in 1995, figures represent the total number of different households reporting over the course of the entire season, even if they did not fish.

^c Data include both subsistence set gillnet and rod/reel harvest.

^d Data include only subsistence set gillnet harvest.

^e No data.

^f 63% set gillnet harvest, 37% rod/reel harvest.

^g 37% set gillnet harvest, 63% rod/reel harvest.

Appendix Table 30. ADF&G, CIAA, and/or CRRC salmon stocking projects and releases of salmon fry, fingerling, and smolt, in millions of fish, Lower Cook Inlet, 1984 - 1996.

SOCKEYE SALMON														
YEAR	eisure Lake	Hazel Lake	Chenik Lake	Paint Upper	River Lower	Lakes Elusivak	Kirschner Lake	Bruin Lake	Ursus Lake	Port Dick Lake	English Bay Lakes	Bear Lake	Grouse Lake	TOTAL SOCKEYE
1984	2.110													2.100
1985	2.018													2.018
1986	2.350		0.839	0.500	0.320									4.009
1987	2.022		1.000				0.867			0.705				4.594
1988	2.100	0.783	2.600	1.100	0.552	0.521	0.521			0.222				8.399
1989	2.000	1.000	3.500	1.000	0.500	0.500	0.250			0.430		2.200		11.380
1990	1.750	1.250	3.250	1.000	0.500	0.500	0.250	0.500			0.350	2.400		11.750
1991	2.000	1.300	2.200	0.500	0.250		0.250	0.250			0.241	1.619		8.610
1992	2.000	1.000	2.750	0.500	0.250		0.250	0.250	0.250		0.290	2.370		9.910
1993	2.000	1.000	1.400	0.500	0.250		0.250	0.250	0.250		0.581	1.813		8.294
1994	0	0	0	0	0		0.300	0	0		0.800	0.170		1.270
1995	1.632	1.061	1.129	0.337	0.251		0.251	0.251	0.252		0	0.360		5.524
1996	1.490	1.030	0.951	0.500	0		0.250	0.250	0.250		0.155	0.864	0.217	5.957
AVG.	1.806	0.936	1.784	0.540	0.261	0.507	0.344	0.250	0.200	0.452	0.345	1.475	0.217	9.117

EAR	PINK SALMON				CHINOOK SALMON					COHO SALMON			
	Tutka Bay Hatchery	Halibut Cove Lagoon	Homer Spit	TOTAL PINKS	Seldovia Bay	Halibut Cove Lagoon	Homer Early	Spit Late	TOTAL CHINOOK	aribou Lake	Seldovia Lake	Homer Spit	TOTAL COHO
1984	14.730			14.730			0.080						
1985	19.560			19.560		0.098	0.152		0.250	0.139	0.083		0.222
1986	22.500	2.000		24.500		0.101	0.104		0.205	0.138	0.072		0.210
1987	19.570	3.000	0.295	22.865	0.084	0.094	0.104		0.282	0.150	0.045		0.195
1988	12.000	3.000	0.300	15.300	0.084	0.094	0.104		0.282	0.150	0.045	0.060	0.255
1989	30.100	6.000	0.332	36.432	0.108	0.115	0.104		0.327	0.182	0.080	0.143	0.405
1990	23.600	6.000	0.303	29.903	0.099	0.112	0.212		0.423	0.180	0.050	0.123	0.353
1991	23.600	6.000	0.303	29.903	0.091	0.092	0.191		0.374	0.180	0.050	0.100	0.330
1992	23.600	6.000	0.300	29.900	0.113	0.117	0.226	0.126	0.582	0.150		0.100	0.250
1993	43.000	6.000		49.000	0.107	0.100	0.212	0.100	0.519	0.150		0.116	0.266
1994	61.000			61.000	0.106	0.107	0.192	0.157	0.562	0.064		0.156	0.220
1995	63.000			63.000	0.113	0.036	0.228	0.124	0.501			0.110	0.110
1996	105.000			105.000	0.109	0.103	0.101	0.121	0.434			0.150	0.150
AVG.	35.482	4.750	0.306	40.537	0.101	0.097	0.155	0.126	0.485	0.148	0.061	0.118	0.327

Appendix Table 31. Catch of Pacific herring in short tons and effort in number of permits by district in the commercial sac roe seine fishery, Lower Cook Inlet, 1976 - 1996^a.

Year	<u>Southern</u>		<u>Kamishak</u>		<u>Eastern</u>		<u>Outer</u>		<u>Total</u>	
	Tons	Permits	Tons	Permits	Tons	Permits	Tons	Permits	Tons	Permits
1976	0		4,842	66	---		---		4,842	66
1977	291	13	2,908	57	---		---		3,199	58
1978	17	7	402	44	---		---		419	44
1979	13	3	415	35	---		---		428	36
1980	---		---		---		---		---	
1981	---		---		---		---		---	
1982	---		---		---		---		---	
1983	---		---		---		---		---	
1984	---		---		---		---		---	
1985	---		1,132	23	204	7	12	2	1,348	29
1986	---		1,959	54	167	4	28	3	2,154	57
1987	---		6,132	63	584	4	202	9	6,918	69
1988	---		5,548	75	0	0	0	0	5,548	75
1989	170	6	4,801	75	0	0	0	0	4,971	75
1990	---		2,264	75	---		---		2,264	75
1991	---		1,992	58	0	0	0	0	1,992	58
1992	---		2,282	56	0	0	0	0	2,282	56
1993	---		3,570	60	---		---		3,570	60
1994	---		2,167	61	---		---		2,167	61
1995	---		3,378	60	---		---		3,378	60
1996	---		2,984	62	---		---		2,984	62
20-Year										
Average	86	8	2,969	56	136	2	35	2	3,083	57
1976-85										
Average	69	8	2,537	48	---	---	---	---	2,606	49
1986-95										
Average	170	6	3,185	60	136	2	35	2	3,321	62

^a Data source: ADF&G fish ticket database.

Appendix Table 32. Preseason estimates of biomass and projected commercial sac roe seine harvests, and actual harvests, for Pacific herring (*Clupea harengus pallasii*) in short tons, average roe recovery, numbers of permits making landings, and exvessel value in millions of dollars, Kamishak Bay District, Lower Cook Inlet, 1978 - 1996.

Year	PRESEASON		Actual Commercial Harvest (st) ^a	Average Roe %	No. of Permits w/Landings	Exvessel Value ^b (\$\$ millions)
	Forecasted Biomass (st)	Projected Harvest (st) ^a				
1978	c	d	402	---	44	c
1979	c	d	415	---	36	c
1980	c	---	CLOSED	---	---	---
1981	c	---	CLOSED	---	---	---
1982	c	---	CLOSED	---	---	---
1983	c	---	CLOSED	---	---	---
1984	c	---	CLOSED	---	---	---
1985	c	d	1,132	11.3	23	1.0
1986	c	d	1,959	10.4	54	2.2
1987	c	3,833	6,132	11.3	63	8.4
1988	c	5,190	5,548	11.1	75	9.3
1989	37,785	5,000	4,801	9.5	75	3.5 ^f
1990	28,658	2,292	2,264	10.8	75	1.8
1991	17,256	1,554	1,992	11.3	58	1.3
1992	16,431	1,479	2,282	9.7	56	1.4
1993	28,805	2,592	3,570	10.2	60	2.2
1994	25,300	3,421	2,167	10.6	61	1.5
1995	21,998	2,970	3,378	9.8	60	4.0
1996	20,925	2,250	2,984	10.1	62	6.0 ^f
1978-95 Average	25,176	3,148	2,772	10.6	57	3.3

^a Kamishak Bay allocation only, does not include Shelikof Strait food/bait allocation.

^b Exvessel values exclude any postseason retroactive adjustments (except where noted).

^c Prior to 1989, preseason forecasts of biomass were not generated.

^d Prior to 1987, preseason harvest projections were not generated.

^e Data not available.

^f Includes retroactive adjustment.

Appendix Table 33. Summary of herring sac roe seine fishery openings and commercial harvests in the Kamishak Bay District of Lower Cook Inlet, 1969 - 1996.

Year	Dates of Openings	Total Hrs. Open	Harvest (short tons)	Catch Rate (short tons/hour open)	Number of Permits w/Landings
1969-73	No closed periods				
1974	1/1 - 5/20		2,114		26
1975	1/1 - 6/6	(Closed Iniskin Bay 5/17)	4,119		40
1976	1/1 - 5/21	(Closed Iniskin Bay 5/17; reopened Kamishak 6/2)	4,824		66
1977	1/1 - 5/31	(Closed Kamishak Dist. 5/12; reopened 5/14 - 5/17; reopened 5/29 - 5/31)	2,908		57
1978 ^a	4/16 - 5/31	96	402	4.2	44
1979	5/12 - 5/15	72	415	5.8	36
1980	CLOSED	0	0		
1981	CLOSED	0	0		
1982	CLOSED	0	0		
1983	CLOSED	0	0		
1984	CLOSED	0	0		
1985	4/20 - 6/15	1,350 (56.2 days)	1,132	0.8	23
1986	4/20 - 6/13	1,303 (54.3 days)	1,959	1.5	54
1987	4/21 - 4/23	65	6,132	94.3	63
1988	4/22 - 4/29	42	5,548	132.1	75
1989	4/17 - 4/30	24.5	4,801	196.0	75
1990	4/22 - 4/23	8	2,264	283.0	75
1991	4/26	1	1,922	1,922.0	58
1992	4/24	0.5	2,282	4,564.0	56
1993	4/21	0.75	3,570	4,760.0	60
1994	4/25	0.5	778	1,556.0	35
	4/29	1.0	1,338	1,338.0	53
1995	4/27	0.5	1,685	3,370.0	45
	4/28	1.0	1,693	1,693.0	44
1996	4/24	0.5	2,984	5,968.0	62

^a Management by emergency order began.

Appendix Table 34. Estimates of Pacific herring (*Clupea harengus pallasii*) total biomass in short tons using two different methods, actual commercial sac roe seine harvest in short tons, and percent exploitation, Kamishak Bay District, Lower Cook Inlet, 1978 - 1996.

Year	Aerial Survey Total Biomass Estimate (st) ^a	ASA Model Total Biomass Estimate (st) ^{b,c}	Actual Commercial Harvest (st)	Estimated Exploitation Rate (%) ^b
1978	1,202	2,345	402	17.1
1979	3,315	5,514	415	7.5
1980	^d	10,492	CLOSED	---
1981	5,130	14,293	CLOSED	---
1982	4,835	21,868	CLOSED	---
1983	4,750	26,311	CLOSED	---
1984	6,500	28,708	CLOSED	---
1985	13,320	31,977	1,132	3.5
1986	26,001	31,611	1,959	6.2
1987	35,332	31,002	6,132	19.8
1988	29,548	26,608	5,548	20.9
1989	35,701	25,367	4,801	18.9
1990	19,664	23,460	2,264	9.7
1991	18,163 ^e	25,171	1,992	7.9
1992	24,077	26,906	2,282	8.5
1993	32,439	30,682	3,570	11.6
1994	25,344 ^e	32,728	2,167	6.6
1995	25,115	32,104	3,378	10.5
1996	21,121	27,640	2,984	10.8
1978-95 Average	18,048	23,730	2,772	11.1

^a Diverse methods have been used to generate historical aerial survey biomass estimates; after 1989, see LCI herring forecast report or statewide herring forecast document to determine specific method for individual year.

^b Figures are based on the best available data at the time of publishing and are subject to change; therefore all figures herein supersede those previously reported.

^c ASA model integrates heterogeneous data sources and simultaneously minimizes the differences between observed and expected return data in order to forecast the following year's biomass as well as hindcast previous years' biomass.

^d No data available.

^e Due to poor aerial survey conditions, biomass was calculated from the preseason estimate of abundance, adjusted to match observed age composition samples in the commercial catch.

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